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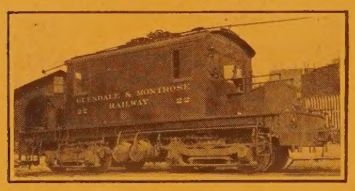

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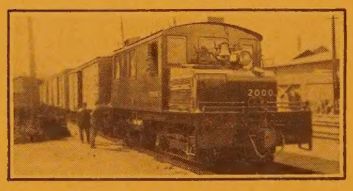

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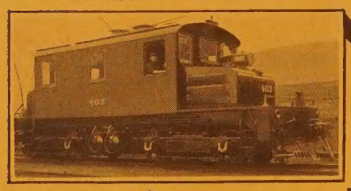

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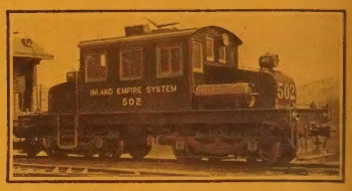

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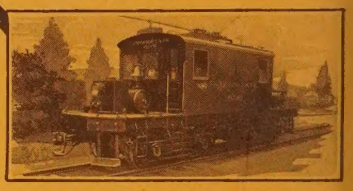

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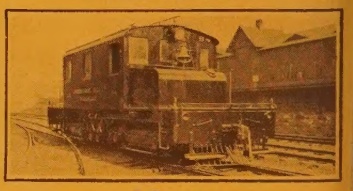

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by Mc-Graw-Hill Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 65 New York, Saturday, March 28, 1925 *Number* 13

Oklahoma City Has Only Itself to Blame

OFFICERS of the Oklahoma Railway, Oklahoma City, Okla., talked themselves hoarse in the past in an effort to prevent the calamity that threatened the railway. City officials and others were deaf to their pleas. Even the retail merchants opposed the reasonable parking provisions suggested by the company. Warnings meant nothing to them. The traction man who spoke in his own behalf could be seeking but one thing—to feather his own nest. Finally the inevitable happened. The railway went into the hands of receivers. The bondholders were for demanding their pound of flesh. As is very often the case, they favored summary action by immediate abandonment of unprofitable lines. That gave the people something to think about. Calamity had come home to them.

The receiver held the bondholders off until he could arrange for a report on the property from an outside source. This has now been made by George H. Clifford, manager of the Northern Texas Traction Company, Fort Worth, which won the Coffin award last year. The summary of his recommendations, printed elsewhere in this issue, speaks for itself. The ideas are excellent, but for many of them the company had pleaded without avail. The receiver has already been authorized to spend $100,000 for improvements. If he is permitted by the court to carry out Mr. Clifford's recommendations in full he will spend $202,500. The spending of this sum, however, is presaged on the assumption that the city will act to curtail practices distinctly unfair to the company. Mr. Clifford has left the city to itself to think things over.

Oklahoma City can be as well served with transportation as is Fort Worth. It will not be, however, unless it takes the lessons of recent months and the recommendations made in the expert's report seriously to heart. It needs to change its attitude. And it needs to do it quickly.

Some Editorial Writers Lose Sense of Proportion

BALAAM, perverse as he was and difficult to convince, made no bid for notoriety. Not so men who write poppycock for pay. The supposition is that any bid for notoriety is better than no bid at all and should be permitted to go unchallenged. Perhaps the worst offenses against reason are committed by papers like the Detroit *Free Press* that repeat the statement, referred to elsewhere in this issue at greater length: "That the trolley car as a means of transportation is already out of date is perfectly obvious." How do they reach that conclusion? Surely not by analysis which has any association with the dull process of reasoning. The statement does everything but square with the facts. But what are facts to the paper with a hammer out for the railways? Would the *Free Press* allow the statement to go uncontroverted that the newspaper is already out of date as a means of dissemination of information on account of the radio?

Says this writer of editorial balderdash: "We are convinced that if the main arteries . . . could be cleared of their tracks and an adequate number of buses substituted for the present trolley cars, the public would be more satisfactorily served." Really! Note the expression "an adequate number of buses"! It seems too bad to have to trample on sacerdotal folly.

The bus has its place, to be sure, but its place is not where this writer and many others like him suppose it is. This can be proved by a little mental arithmetic. Pity is needed for the man who is not even cognizant of developments in his own city under his own eyes that contradict what he says. According to him, the city bought junk when it took over the city lines of Detroit. If it did, which is a question, then the men in Detroit who are responsible for handling the city's large investments are merely seeking to perpetuate the system by pouring millions of dollars into a property for which the junk was an outward evidence. If the instance of editorial thinking displayed at Detroit were an isolated one, it might be allowed to pass unnoticed. There are too many wizards with words victims of the bus bacillus of pathogenic propensity. That is the trouble. Optimism with respect to the bus is a delightful thing where it is not the result of ignorance.

Intensive Development Needed to Restore Detroit United Earnings

MORE than 600 miles of interurban railway passed under the jurisdiction of the court in the recent receivership action against the Detroit United Railway. Naturally the event provoked considerable discussion in financial circles. Now that it has happened, it is easy enough to say that the receivership was unavoidable. Figures tell the story. The net income in 1924 after depreciation, etc., was $152,384, as compared with $512,751 in 1923. These and other statistics included in the annual report, an abstract of which is published in this week's issue, are all points to ponder. They are significant, but they are not staggering. The receiver is optimistic of the future, and the bankers who handle the company's securities while concerned with the outcome are not distressed at the course events have taken.

Long before he died, Mr. Stevenson had laid down a comprehensive program for the development of the property. In this he had the consent of the bankers. It is, of course, unfortunate that greater progress has not been made toward the fulfillment of this program, but it was economically sound under the changed conditions of the property and it would seem that as soon

as the impediments natural to the receivership have been removed the plans will be proceeded with aggressively. It will be recalled that there has been no default in the payment of bond interest or in meeting sinking fund requirements.

The controversy with the city over the purchase of the local lines in several years removed now, but it was not without its effect in the present instance in that it tended to dissipate the energy of the management by requiring it to direct its endeavors along unproductive lines. It was the duty of the management to protect the investment represented by the company's railway lines in the city, but it could hardly carry on successfully at the same time two dissimilar processes. Technically, the management has shown ability, but need exists for the development of greater merchandising sense. The tools for this work are all largely available. The physical equipment of track and line is good, there are many new cars, some fine auto coaches and good terminals. Much of the road is over a private right-of-way. Lack of diversity of industry is an inherent economic drawback to the territory in which the company operates, but there need be no great cause for concern even over this. There recently have been some rate readjustments in favor of the company. Others are required.

Developing New Sources of Revenue

ONE interurban electric railway operating out of a large mid-Western city has several important lines that for years have handled a good passenger business. Within recent times this traffic has fallen off due to conditions of competition, both from private automobiles and from buses, that are familiar to many. The same heavy cars have been used for nearly 20 years. Headways have not been changed materially. In fact, nothing has been done to make the public believe that there can be anything new in the way of its interurban service.

Another line reaching the same city stands in marked contrast. Even though it does not pass through territory that is so well built up, nor which has the same possibilities as the former system, this road in the past few years has been engaged in a program of modernization that has permeated into every department. When it became apparent that competition might affect passenger revenues adversely, new light-weight cars were bought. These were of a modern design and painted a distinctive color, so that it was not possible to confuse them with the old cars. Schedules were tightened up by eliminating delays as far as practicable. Limited and other special services were started.

Not content with improving its passenger service, this same road investigated carefully the possibilities of handling freight and express. Under the direction of a competent traffic manager with steam railroad experience, numerous plans were developed and put into practice for securing carload and less-than-carload business. So successful has this been that today the railway's track is taxed to its capacity.

The next move that is contemplated is the installation of buses for local business so as to relieve the track for high-speed limited service and also for freight. It is claimed that this will permit a still further increase in the revenues of the railway and give it a wider field of usefulness.

Nothing could illustrate more clearly than this comparison the differences that often exist between managements and their methods. Even though the electric railway industry is today in an excellent financial condition there are properties which are not going ahead, not moving along with other developments in the industrial field, not even holding their own, but are drifting. While such a policy of stagnation may get by for a time, sooner or later it will lead to failure. It is well for each management to take stock and see if the property is among the leaders, and if not, how it can be placed with them.

Chambers of Commerce Constructive Aids to Better Transportation Conditions

THE placing in nomination of Philip H. Gadsden of Philadelphia to succeed himself as a director of the Chamber of Commerce of the United States is encouraging to those who consider transportation one of the important matters before the national chamber. Since Mr. Gadsden has been a director of the chamber, he has been most active in endeavoring to secure through it a broad answer to the most acute transportation questions now before the country. This is instanced particularly by the five committees appointed by the chamber about two years ago to study all the principal phases of the transportation problem. Mr. Gadsden was a member of the committee on "Relation of Highways and Motor Transport to Other Transportation Agencies" and of the sub-committee on "Taxation," and the reports of these committees, published in November, 1923, did much to develop the idea of the co-ordination of agencies, which today is accepted as desirable. Other important aid given by him to transportation matters outside of offices which he has held with the American Electric Railway Association have been as chairman of the National Committee on Public Utility Conditions during the war and as a member of the Federal Electric Railways Commission. Though much progress has been made during the last few years in settling electric railway and allied local transportation problems, much remains still to be done, and a great deal of it can best be undertaken on a national basis. The interest taken by the Department of Commerce in highway traffic and safety is symptomatic of this. With Mr. Gadsden re-elected a director of the national chamber its continued interest in transportation matters is assured.

This occasion should not pass without a plea to railway managers to take an active interest in their local chambers of commerce and boards of trade. These organizations are unique among civic bodies in that they represent primarily the active business man of the community. Hence their members are apt to be well representative of those who will look upon local transportation from a business standpoint and to realize the close relation which good transportation has with business prosperity. They are therefore not only likely to be sympathetic with any improvement in local transportation, but their positions on such matters should carry great weight. In other words, they are the natural allies of the local railway company if they understand its problems, and any railway manager who neglects this opportunity for assistance from his local chamber is not doing all he should for his company and the industry.

Financing Rapid Transit Facilities

Special Assessment Against Benefited Property Is Advocated as an Equitable Method Under Modern Conditions of Financing Rapid Transit Construction — Examples Are Cited to Show that the Unearned Increase in Property Values Is Sufficient to Pay a Large Part of the Cost of Rapid Transit Facilities

*By C. E. Smith**
Consulting Engineer, St. Louis, Mo.

THE construction of transit facilities needed to meet the traffic requirements of a large and rapidly growing city calls for the investment of money at an ever-increasing rate, and the financing of this capital outlay and the return thereon form the nub of the transit problem of today. This conclusion was recently reached by the special rapid transit committee of the St. Louis Board of Aldermen which was engaged in a study of the possibilities for rapid transit in that city.

The immense sums of money required for rapid transit construction and the unwillingness of the public to grant franchises to private companies for a sufficiently long period to justify the investment of private capital for such purposes have led to the investment of public funds for that purpose during the last 30 years.

Although all of the original elevated railroads in New York City, Chicago, Boston and Philadelphia, and also the Market Street subway in Philadelphia and the Cambridge subway of the Boston Elevated were built with private funds, the expenditures made by public utility companies for this purpose were small compared with present-day costs of rapid transit construction. Consequently the practice of carrying out subsequent construction with public funds has been followed quite generally, and has become the adopted policy. This is also the announced policy of a number of other cities, including Chicago, Detroit, St. Louis and Los Angeles.

Several Ways of Financing Public Construction

Public funds may be used for rapid transit construction under one or more of the following plans:

1. By the sale of bonds, the fares being made high enough to pay interest and sinking fund charges in addition to all other costs of operation.

2. By the sale of bonds, the interest and sinking fund to be paid out of general funds of the city, and collected from the taxpayers in the general tax rate.

3. By assessing part or all of the construction cost against specially benefited property.

The first method has been rigidly adhered to in Boston, where part of the subways were built with public funds and leased to an operating company at a rental consisting of interest and sinking fund on the bonds and the cost of maintenance. Partly by reason of the carrying charges of the rapid transit facilities, (part of which had been paid for by public funds and part by private funds), partly by reason of the duplication of surface and rapid transit service, partly from automobile competition but principally to the increased level of operating costs, the issue was squarely presented there as to whether the subway rentals would be waived and collected from the taxpayers in order to hold fares down, or whether the fare would be raised to a point high enough to carry all of the increased costs and continue the payment of the subway rentals. The matter was decided in favor of the latter method. Fares were raised to 10 cents except for short rides in suburban districts which now cost 6 cents, making the average fare about 9 cents. This has been sufficient to pay the entire cost of service, including the subway rentals.

Fixed Charges from Taxes in New York

Assessment of subway rentals against the taxpayer has come about from force of circumstances in New York City. There, under the original lease (contract No. 1), the same arrangement was put in effect as at Boston. The first subway, including some elevated line, was built by the city and leased to the operating companies at a rental covering interest and sinking fund on the bonds, and maintenance. For several years after that arrangement went into effect, the 5-cent fare was adequate to pay all costs of operation, including the rapid transit rentals, but with rising costs it became necessary either to raise the fare above 5 cents, or for the city to give up the subway rentals which the operating companies could not pay out of a 5-cent fare. Contract No. 2 for a short extension was on the same basis.†

The companies sought to increase the fare, but the city successfully resisted these efforts, by reason of the peculiar contractual relations between the companies and the city, and for several years has not received rentals on the greater part of the rapid transit facilities. It has continued to receive rentals for the first group of rapid transit facilities that cost the city approximately $65,000,000, but has not for several years received rentals for the second group of rapid transit facilities that cost the city approximately $250,000,000. The result has been that the city has charged the taxpayer approximately $70,000,000 for interest and sinking fund charges on rapid transit bonds, in order to help keep the fare down.

In Philadelphia, public funds have been used for the

*The author is consulting engineer for the city of St. Louis, and the conclusions presented here were included in a progress report of a special committee of the St. Louis Board of Aldermen which has been studying rapid transit facilities for that city.

†The city's investment under contracts Nos. 1 and 2 was about $60,000,000, on which the leasing company (the Interborough Rapid Transit Company) pays 5 per cent for interest and 1 per cent for sinking fund.

In March, 1913, the so-called "dual" contracts or contracts Nos. 3 and 4 were made with the two companies in New York for extensions to the existing rapid transit systems. The terms of these contracts were quite different from those of contracts 1 and 2. Briefly, these contracts provided that the operating revenues should be devoted, first, to the payment of rent, taxes, operating expenses, maintenance and depreciation, then to the payment of 6 per cent for interest and sinking fund on the investment of the companies under these contracts, plus a certain agreed amount, based on the average annual income previously earned from the operation of their privately owned lines. If any surplus then remained it was to be devoted first to the payment of interest and sinking fund on the investment of the city, plus certain sums to correspond to those paid to the companies over and above the fixed charges on their new capital. Any further profit was to be divided. The earnings have never been sufficient after operating expenses, etc., to meet the companies' deductions, which have priority over the return on the city's investments.—EDITOR.

construction of an elevated railroad, and are now being used for a comprehensive subway system. No part of the city subway system has been completed or placed in operation. An elevated railroad 6½ miles long built by the city has been leased to the operating company for a rental of 1 per cent the first year, 2 per cent the second year, 3 per cent the third year, 4 per cent the fourth year and 5 per cent the fifth year and thereafter. The interest and sinking fund on city bonds amount to more than 5 per cent. The difference between the amount the city has to pay and the amount it will receive from the operating company will be collected by general taxation and paid out of the city's general funds.

Assessing Cost on Benefited Property

The third method of assessing the cost of rapid transit construction by benefit assessments against specially benefited property has not yet been adopted to any considerable extent, although innumerable municipal improvement projects for the purpose of improving transportation have been carried out, and the cost has been paid by assessments against specially benefited property.

Notable among these is the Twin Peaks tunnel in San Francisco. Here a considerable settlement in a valley southwest of the city was separated from the city proper by a mountain about 1,000 ft. high, making access very difficult. A benefit district was formed, consisting of lands on both sides of the mountain, and a subway for street cars only, with two intermediate subway stations, was built through the mountain, length 2½ miles, cost $4,000,000, which was paid for by the Twin Peaks Tunnel Assessment District. The city street railway department spent $250,000 for construction of tracks and electrical equipment and provided cars.

According to City Engineer M. M. O'Shaughnessy, there were 4,813 acres in the assessment district, 4,153 acres on the side beyond the mountain, and 660 acres on the city side along Market Street. Distribution of the assessment was about $3,400,000 for the larger area, and $600,000 for the smaller area. It was paid in ten yearly installments, with deferred payments carrying 7 per cent interest. The work is all done now and the tunnel is paid for and everybody is happy.

The original rapid transit act of New York City (chapter 4 of the laws of 1891) was not specific in outlining the method by which the city could finance rapid transit facilities. Section 37 of that act was amended in 1911, to permit raising the cost of rapid transit facilities by benefit assessments against specially benefited property. Because in the beginning the 5-cent fare for the tremendous volume of traffic was sufficient to pay interest and sinking fund on rapid transit construction, little attention was given to this authorized method of financing by benefit assessments. With the increase in costs, the failure of the operating companies to pay the rapid transit rentals, and the necessity for the city to raise the interest and sinking fund by general taxation, the method of financing by benefit assessment has again come to the front.

The City Club of New York made a detail examination and analysis of the benefits that have resulted there as the result of rapid transit construction. It was found that as soon as the rapid transit program was announced and construction was begun, property along the rapid transit routes increased considerably in value. In some places where it was learned that stations would be located there was speculation in real estate and values increased rapidly. The increase has continued during the operation of the rapid transit routes.

In the borough of the Bronx the increase in land values along a rapid transit line 3.8 miles long was studied. For a strip 1 mile wide, one-half on each side of the rapid transit route, the value of the land before the route was announced amounted to $33,000,000. Seven years later, after the rapid transit facilities were in operation, the same land was valued at $78,000,000, an increase of 133 per cent. During that period the normal increase of land not adjoining the rapid transit route was 40 per cent. The remaining 93 per cent, about $30,000,000, of increase was undoubtedly due to the rapid transit facilities. As the length of this line was 3.8 miles, the increase in land values due to rapid transit over and above the normal increase in the same period amounted to more than $8,000,000 per mile of the rapid transit line. This portion of 3.8 miles was partly subway and partly elevated construction.

Another study was made by the City Club of a route in Manhattan Borough above 125th Street, length 4.4 miles, practically all subway. The total value of land for a strip 1 mile wide along this line was about $47,000,000 before the rapid transit line was announced. Seven years later, when the line was in operation, the land was valued at $116,000,000, an increase of nearly $70,000,000, or nearly 150 per cent. The normal increase of adjoining land in that vicinity was about 43 per cent. The extra increase due to rapid transit, in excess of the normal increase, amounted to more than 100 per cent, nearly $50,000,000, which, spread over the 4.4 miles of route, indicated an increase due to rapid transit alone of more than $11,000,000 per mile of rapid transit route.

On both these lines the increase in land values has continued at a more rapid rate than other lands not served by rapid transit routes.

Merchants to Pay Benefit Assessments

This subject has also been brought sharply to the front by the proposal of merchants along Sixth Avenue, New York, to have the city purchase the elevated railroad there, take it down, and install rapid transit subway; the merchants to pay benefit assessments equal to 10 per cent of the value of their properties. Roughly, this offer amounts to approximately one-half the cost of the improvement. It is thought that by taking more property into a benefit district the property assessments could be made to equal the entire cost.

In Detroit, constitutional debt limitations made it necessary for the city officials to direct their attention to other means of financing rapid transit facilities. The conclusion was reached that the entire cost of construction of the fixed improvements consisting of subways and elevated lines should be assessed against specially benefited property, and that the rolling equipment, the tracks, the electrification, substations, etc., should be provided by the operating company. This method of financing was submitted to the voters in an election during September, 1924, and was approved by a vote of nearly four to one.

There is no doubt whatever that rapid transit increases the value of property located convenient to rapid transit routes, and there seems no good reason in equity why the owner of such property and the recipient of such benefits should not pay toward the cost of the rapid transit facilities some part of his

unearned increment in value. The benefit is considerably greater at the entrances and exits of rapid transit stations than at points a greater distance away, but increased property values can be detected more than ½ mile away from the stations. The increase in property values amounts to more around stations in congested districts, where tremendous numbers of people pass, than at outlying stations where the people are fewer. Particularly is this true of downtown department stores, office buildings, hotels, theaters and other such institutions that have direct connections with rapid transit stations.

The conclusion that was reached in Detroit that the cost of construction of the fixed improvements should be paid for by benefit assessments against specially benefited property, and the cost of electrification, the tracks and the cars should be provided by the operating company and supported by the fare paid, seems a reasonable division of the cost, and we are ready to recommend that division for serious consideration at St. Louis.

At first thought it might appear that by this method private property owners would be providing facilities for the enjoyment of public utility companies. This is not true, as the public utility companies would not be permitted to charge anything for the use of the rapid transit facilities, nor would the car rider be compelled to contribute through his fares to the cost; the fares would carry only the maintenance of the facilities. The principle of furnishing rapid transit facilities for rapidly and safely moving the population of a large city is not essentially different from that of furnishing streets. Street widening and street openings are largely paid for by benefit assessments against specially benefited property, and the users of the streets are not charged anything for their use except the cost of their upkeep.

The problem is not essentially different when facilities are provided for a certain kind of traffic, such as electric car traffic. It is fully established that cities have the right to restrict the use of certain streets and boulevards to certain types and kinds of vehicles, and to control the traffic in any street and otherwise to exercise their police power for the general welfare. Essentially the only difference between a rapid transit route and a surface street, on either of which tracks may be laid and cars operated, is that the rapid transit route is usually at another level than the usual street surface, but that merely indicates that present-day traffic problems require us to think beyond the two dimensions of width and length, and consider now the third dimension—height.

The Michigan Boulevard Link Bridge and the South Water Street improvement under way in Chicago are good illustrations of this. There Michigan Avenue has been double-decked and South Water Street is about to be double-decked. The cost of the double level for the handling of traffic, restricted against truck traffic on the upper level and practically devoted to truck traffic on the lower level, is being paid for partly by the city direct and partly by benefit assessments against specially benefited property.

Highways have been provided at the expense of the public from the very earliest days. In some instances where the public did not provide enough of them, toll roads were provided by private capital, but practically all toll roads have been absorbed by the public. Until the day of the railroad, all the traveling public was ever called upon to furnish was the conveyance and the means of locomotion. This principle held even when omnibuses and stage coaches were operated, but with the advent of the street railways, requiring rails, the cable railway requiring underground construction, and the electric railway requiring tracks and trolley wires, the companies engaged in that service were not required to provide their own streets, but merely to pay for the construction in them made necessary by their operation, and to provide their moving equipment.

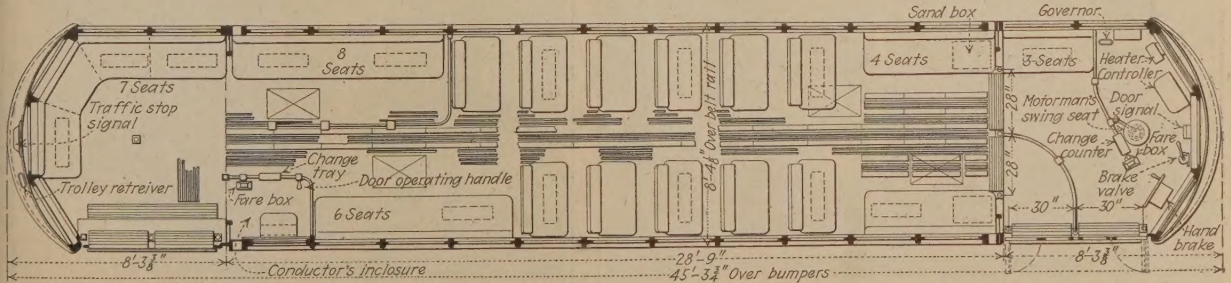
Similarly it would seem logical, now that the public cannot be transported satisfactorily on streets furnished by the public, for the public in its own interest to provide another roadway level separate from present levels, on which the operating company would provide such tracks, electrical equipment and cars as would be necessary for handling the traffic. Of course, facilities provided from benefit assessments against specially benefited property should be just as free for use as the streets, and no additional charge should be included in the fare for the use of such facilities.

"Near-Side" Cars Operated in Ottawa

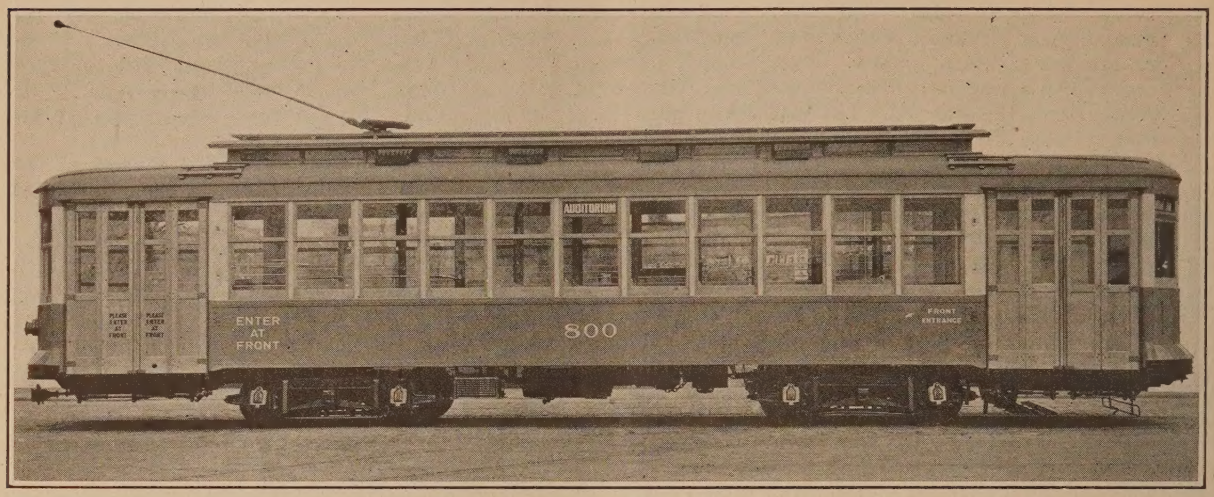
New One-Man, Two-Man Cars of the Ottawa Electric Railway Are Arranged for Front-Entrance and Pay-Leave Operation—Red Light on Front Dasher Gives Warning When Car Is About to Start

WITH the introduction of 20 new double-truck, front-entrance motor cars by the railway, the near-side stop has been adopted in Ottawa, Ont. The new cars are of the single-end type and may be operated by either one man or two men. Passengers enter at the front and leave at the rear. With two-man operation the pay-as-you-leave plan of fare collection is used, while fares are collected pay-enter with one-man operation.

With two-man operation the conductor's position is just to the front of the rear doors. Aluminum railings,



Floor Plan of Double-Truck, Single-End Motor Car for Ottawa Electric Railway



These Cars Are Arranged for Front-Entrance, Rear-Exit Operation

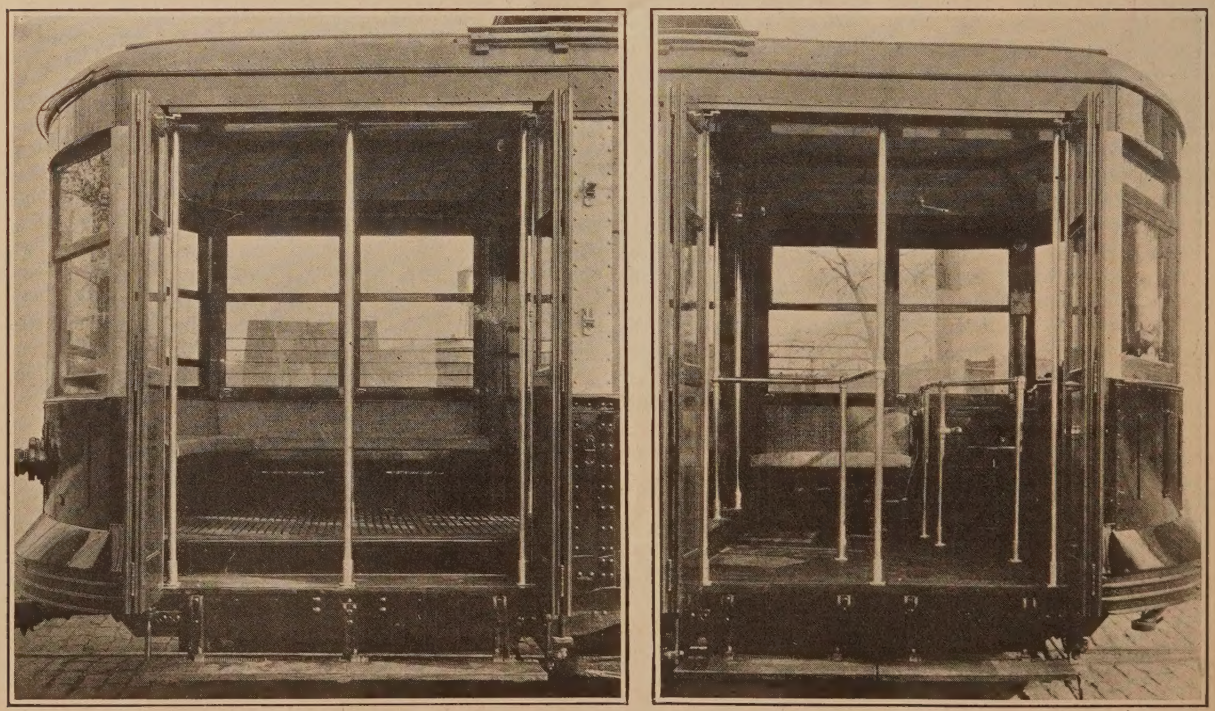
foot rest and a change tray are provided, together with a transfer and supply box below the tray.

Car bodies are of all steel construction, with monitor type roof. They have a length over all of 45 ft. $3\frac{3}{4}$ in., a seating capacity of 52 and weigh completely equipped, but without load, 38,750 lb. The front end of the cars has longitudinal seats for 11 passengers. Ten cross-seats are provided in the center of the car, and the rear has longitudinal seats which continue around the rear vestibule end. The rear vestibule floor is on the same level as the car body floor. One step is provided just inside the doors. The front platform is lower than the car body floor and there is a single step at what would nominally be the bulkhead.

Seats are upholstered in rattan and the car interior is finished in cherry with Panelite headlining. In order to distinguish the new cars from the old, they are painted red, while the older equipment of this company in painted green.

Doors are interlocked electrically with the car control. Signal equipment includes a light in front of the motorman's position and red and green signal lights at the rear. A new feature will be an arrangement by which the motorman's signal light shows forward through a red lens, to warn people in front of the car that it is about to start. This light is thus located just above the front window sill.

The cars were built by the Ottawa Car Manufacturing Company and the trucks were supplied by the Canadian Car & Foundry Company. Additional details of the car dimensions and equipment were published in the ELECTRIC RAILWAY JOURNAL for May 17, 1924.

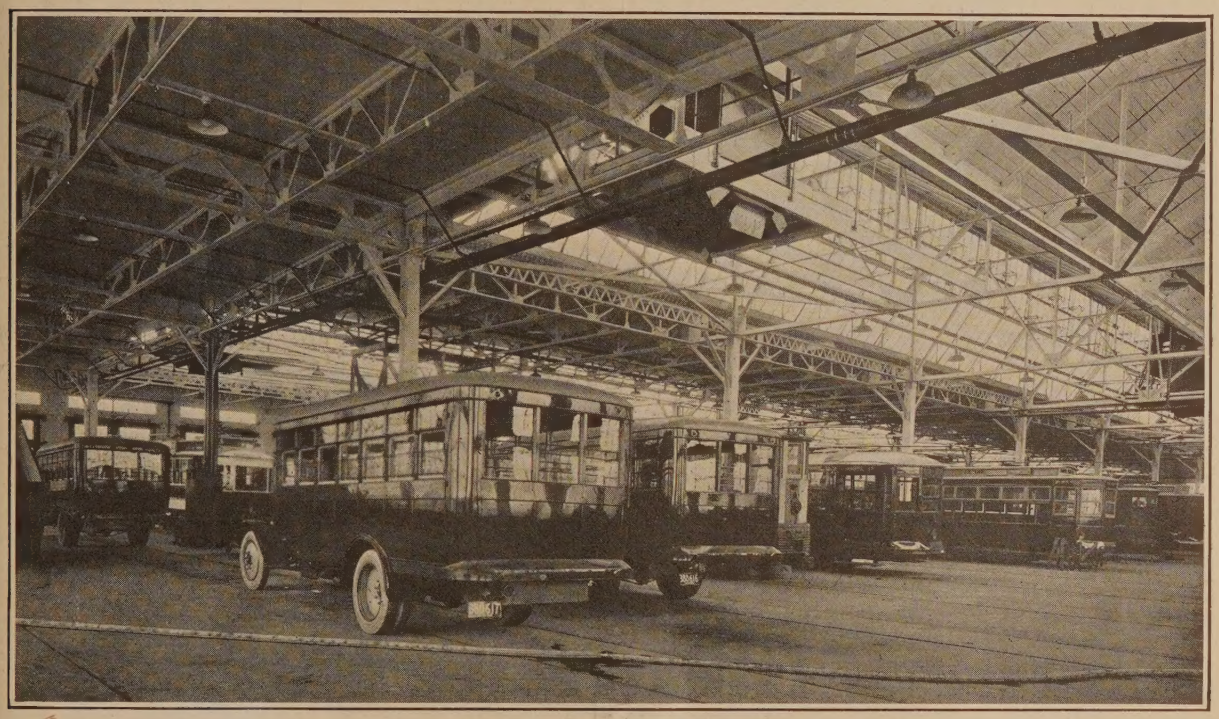


Entrance and Exit Arrangement. At Left—Exit with One Step Inside Car and Double Folding Step. At Right—Front Entrance with Double Folding Step

Wiring and Fire Protection at Everett

*Fifth Article**

Ring Feeds from Outside Wood Mill and Paint Shop Provide Flexible Electric Service at Boston Elevated Shops—Careful Study of Shop Lighting Preceded Installation—Well-Developed Sprinkler and Hose Service System Used with Alert and Trained Squads



Lighting Arrangement in Paint Shop

THE electrical distribution system of the new Everett shops of the Boston Elevated Railway has been planned particularly so as to provide for continuity of service and to keep the working areas of the shops unhampered by the wiring system.

The main substation, where the incoming lines enter, is at one side of the paint shop, as shown in the illustrations. From this point four cables are run in a tunnel to the near side of the paint shop, whence the circuits branch to the ends to serve the wood mill and dry kiln. These four cables are each No. 000 and lead-covered. One power service cable is run from the tunnel outlet at the paint shop around the south side of the paint shop and wood mill and thence along the west side of the latter and into a safety-front switchboard near the wood mill stockroom (shown on page 873, issue of Nov. 22, 1924). The other power cable passes around the north side of the shops and terminates at the dead-front board just mentioned. In case either cable fails the other will care for the local power load.

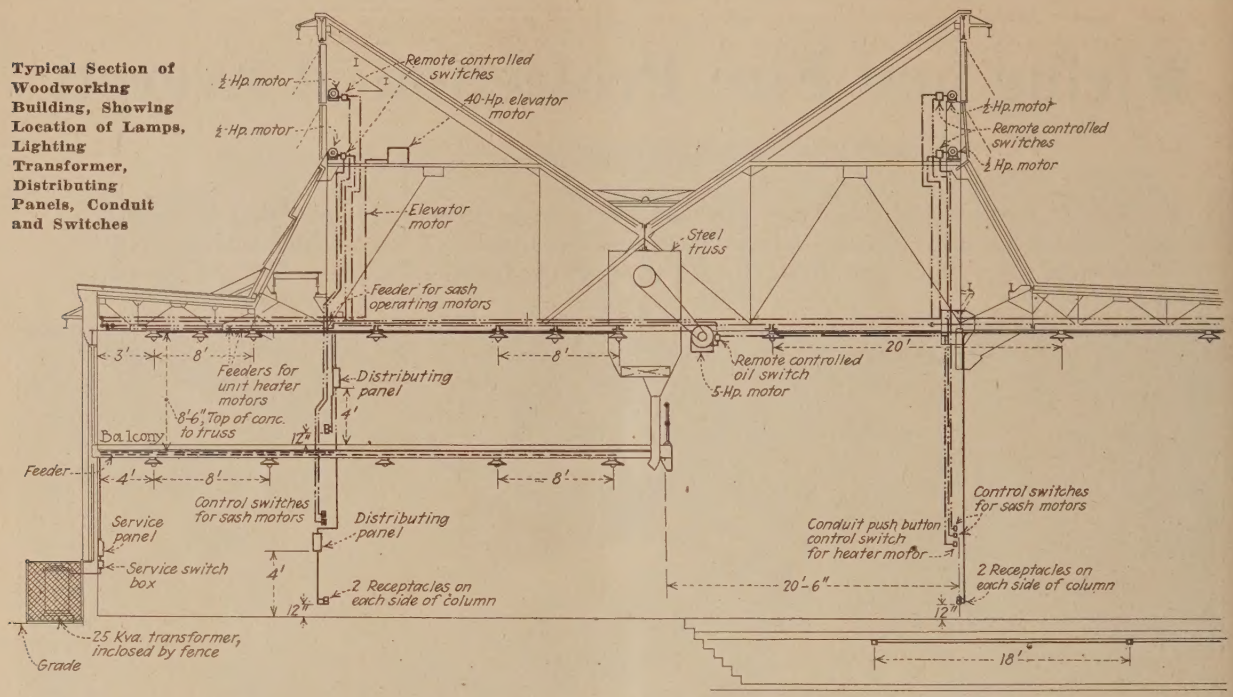
All power service is handled at 550 volts, while the lighting current is stepped down to 110/220 volts through transformers located in the paint shop basement, outside the paint shop and wood mill walls on reinforced-concrete platforms a few inches above the ground level, and in the basement of the dry kiln. These transformers are fed by the 550-volt cables. The secondary circuits are carried from the transformers to main switch panels, from which local lighting distribution cabinets are fed.

One lighting service cable runs around the north side of the shops to the southwest corner of the wood mill. Another is carried around the south end of the paint shop to the dry kiln. Taps from the lighting cables are also carried into the paint shop to serve local lighting transformers mounted in the basement. The three phases are balanced as evenly as possible.

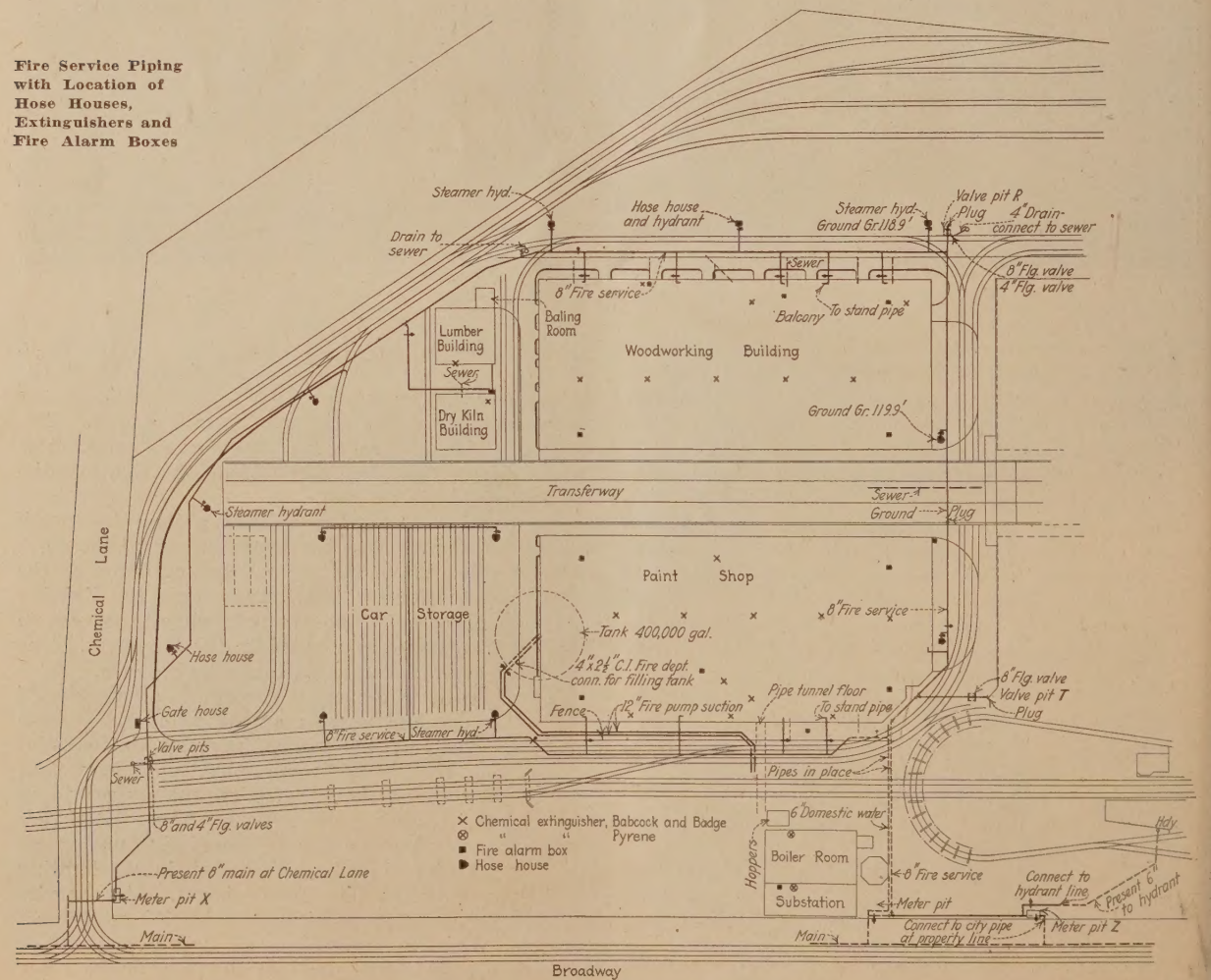
Taps from the power cables are run to a switchboard in the east central portion of the paint shop, from which the local feeds are run to the motors in the paint stock room, to elevator motors controlled by Condit remote-operated switches, to skylight motors and to all fuses of paint stock room motors. These latter are outside the stock room for increased fire protection. The solid neutral has been installed in all lighting service and distributing panel boxes. All service switches for lighting are Westinghouse-Krantz fused, two-pole, safety-inclosed auto-lock units, and power switches are three-pole units of the same make. For

*Previous articles on the new Everett shops of the Boston Elevated Railway were published in ELECTRIC RAILWAY JOURNAL for Nov. 22, Dec. 13, Dec. 27 and Jan. 31.

Typical Section of Woodworking Building, Showing Location of Lamps, Lighting Transformer, Distributing Panels, Conduit and Switches



Fire Service Piping with Location of Hose Houses, Extinguishers and Fire Alarm Boxes



lighting, feeder panels are two-wire Westinghouse-Krantz safety auto-lock control panels mounted in steel service boxes, with two-wire branch circuits equipped with fuse and switch.

Before the lighting installation was made, Jackson & Moreland, engineers, Boston, made a study of illumination in six electric railway shops in the East and Middle West and worked out the local requirements at Everett on the basis of a comprehensive analysis of the problems of the Boston company. The accompanying table gives the foot-candle intensities decided upon and realized in the Everett shops, perhaps the most difficult determination being the intensities desirable and practicable on the sides of car bodies standing in the paint and repair shops.

LIGHTING INTENSITIES ADOPTED IN EVERETT CAr SHOPS, BOSTON ELEVATED RAILWAY

Paint Shop

Locations	Foot-Candles*	Locations	Foot-Candles*
†Main floor	10	Rest room	8
Glass storage	4.5	General offices	9
Paint room	8	Accident room	11
Toilets, lockers and washrooms	5 to 6	Sign painting	11
		Stairways and passages	4

Wood-working Shop

Locations	Foot-Candles*	Locations	Foot-Candles*
†Main floor	10	Toilets, lockers and washrooms	5 to 6
Milling section	9	Cabinet and upholstery section	8
Sash and door section	12		
Stock rooms	5.5		

Lumber Storage

Locations	Foot-Candles*	Locations	Foot-Candles*
First floor	3	Baling	3
Center aisle	6.5	Baling room	5

Dry Kiln

Locations	Foot-Candles*	Locations	Foot-Candles*
Drying and equipment section	3-4	First and second floor storage areas	3

Yards

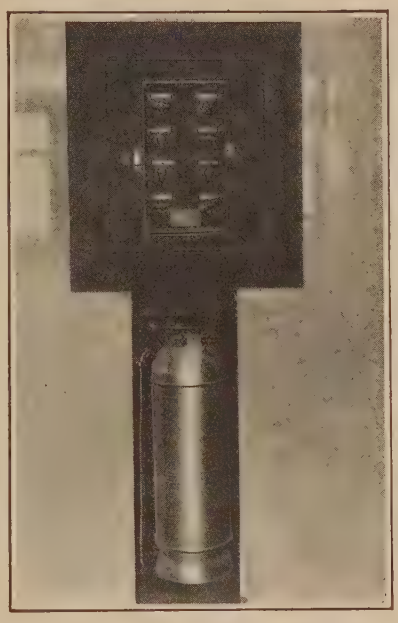
Locations	Foot-Candles*	Locations	Foot-Candles*
General yard	0.03 to 0.07	About buildings	0.05 to 0.08

*The working plane for all foot-candle measurements for interior lighting was taken at 2 ft. 6 in. above the floor and for yard lighting at 1 ft.

†The main floor units are so placed and selected that the intensity of illumination on the sides of car bodies for painting and repairs varies from an average of 12-ft.-candles at the car eaves to 2-ft. candles at the bottom of the body.

In general the paint shop and wood mill interiors are lighted by 500-watt Mazda C lamps, spaced 16 ft. x 20 ft. apart and equipped with Mogul sockets and 20-in. Westinghouse RLM reflectors. The lamps, between each pair of tracks, are in general three per circuit, mounted on roof trusses at a height of 20 ft. above the floor, and are controlled from switch cabinets located on the columns and in some cases on adjacent walls. Inside lighting for car painting is furnished by the car lighting units or by portables with heavy-duty cords attached. Pits in the wood mill are equipped with plug outlets for portable lamps. Supplementary angle lights are installed on the shop walls and a widespread use of 100-watt lamps is made on the wood mill balcony. Including yard lamps, 1,002 lamps are now in service at Everett, and 458 base plugs are provided on the walls and columns, all wiring being in rigid conduit.

The yard lighting is by 500-watt lamps, mounted some 20 ft. above ground on poles or wall brackets, as the case demands, and these lamps are divided into two groups of circuits controlled from the interior of the paint shop and wood mill and supplied from local transformers in these buildings or immediately outside.



Lighting Switch Cabinet with Fire Extinguisher Underneath

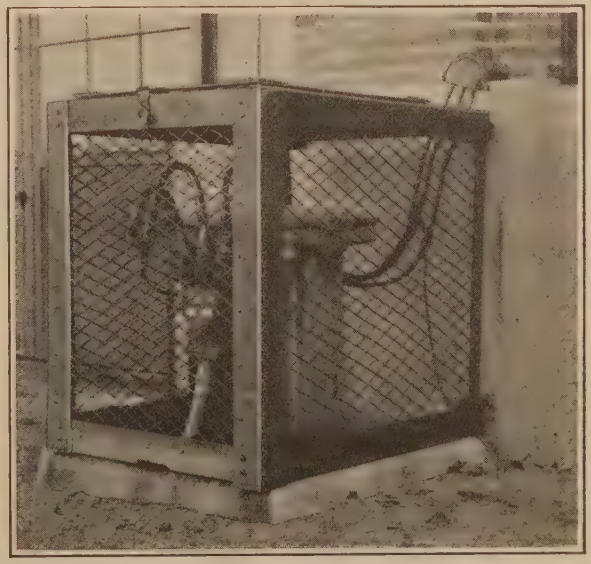
The Westinghouse-Cutter type CI "Luxsolite" fixture is used with 20 - in. reflector and 8½-in. skirted refractor.

The lumber storage building is illuminated by two 50-watt lamps per compartment, on both the ground floor and balcony sections. An additional row of lamps is placed under each walkway. In the central light shaft of this building three 300-watt lamps are mounted at the top of the opening under the trusses. All lamps used in this building are heavily guarded against mechanical injury. Snap switches at entrances of the compartments on each level control the interior lamps.

In the dry kiln there are twelve 75-watt lamps mounted 12 ft. above the floor and provided with guarded reflectors. These lamps are wired in two circuits through concealed conduit. They are controlled from a distribution cabinet outside the drying room. In general the kiln room lamps are spaced on 8-ft. 5-in. x 10-ft. 6-in. centers. In the paint stockroom 150-watt lamps spaced on 10-ft. centers are standard.

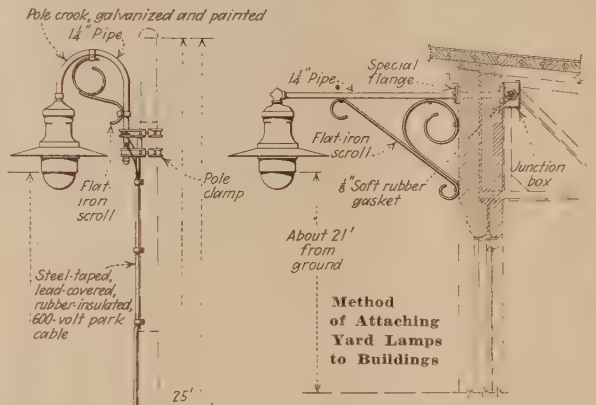
In each of the two larger buildings a watchman's circuit of twenty 300-watt lamps is provided, controlled from special cabinets on the floor. The total connected lighting load of the buildings at present aggregates 250 kw.

The paint shop and wood mill are equipped with the



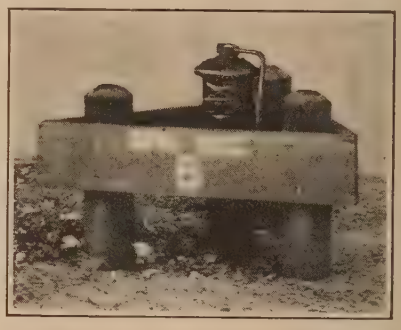
Lighting Transformer with Screening and Concrete Base at Entrance to Wood Mill

wet-pipe system of sprinkler protection, 966 heads being installed in the former and 956 in the latter. The lumber storage building and dry kiln are piped for the dry-pipe system, with 68 and 70 heads respectively. An 8-in. city fire service main completely surrounds the shops. This main connects at the north and south ends of the property with a 24-in., 55-lb. street main on the Broadway side. A cross connection from the gate-house on Chemical Lane to the northeast end of the paint shop completes the 8-in. loop around the buildings. Six-inch branch pipes lead at intervals into the buildings from the looped main, and the usual system of alarm valves is provided at the standpipe connections within the building. The alarm valves are equipped with annunciator connections to indicate the section where an opening occurs, as is usual practice. A five-drop annunciator is located on the side of the balcony in the wood mill and a similar four-drop annunciator is mounted on the side of the paint shop balcony.



Type of Lamp Post Used in Yard Lighting

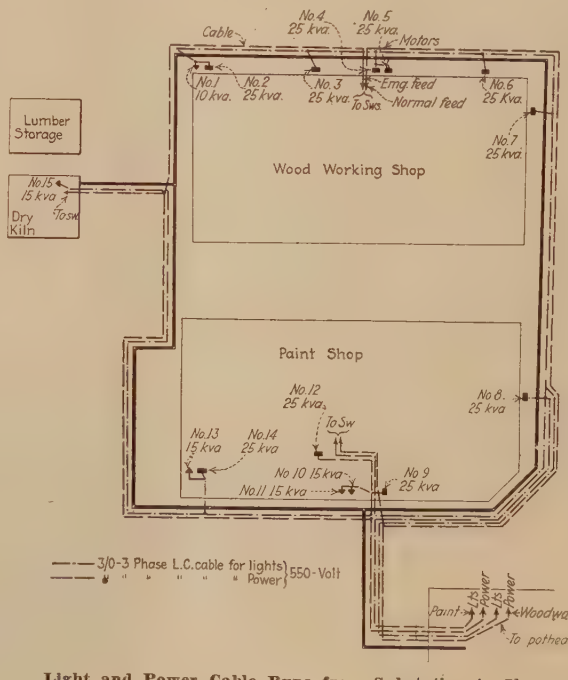
Method of Attaching Yard Lamps to Buildings



Standpipe Valves Outside of Shop Are Protected from Mechanical Injury

On the site of the paint shop was formerly located a 400,000-gal. fuel oil tank which straddled the south end wall of the paint shop. As the underwriters required the plant to have an auxiliary water supply it was decided to utilize this tank for the purpose. This was done by removing the top, which was of flat plate construction, lowering the grades of the sidewalks and partitions and installing concrete construction to carry tracks in the building and yard. Two 12-in. suction pipe lines from this tank run into the boiler house, where a 1,000-gal. per minute, single-stage, centrifugal, combined motor and steam-turbine driven fire pump is installed. This pump will deliver water at 125 lb. per square inch and will be augmented by another pump which will use one of the two foregoing suction lines from the tank when the shops are extended. The tank is filled either from a hydrant connection in the yard or from the standpipe system in the shops, as desired. Four hose outlets are installed on the outside of the boiler house and throughout the yard are twelve hose houses, four on the north side of the wood mill, one on the north side of the paint shop and the rest in the southerly end of the yard in the vicinity of the car storage tracks and lumber storage.

On the roofs of the wood mill and paint shop are warmed inclosures carrying hose outlets with long-handled valves which are operated from outside. The hose runs are coiled on portable frames which can be quickly pulled out of the house over rollers and dropped upon the flat roof section for convenience in serving the different portions of the roof. Another convenience which is designed to prevent rotting out the hose piping in the standpipes inside the buildings is the use of a small ball valve with drip pipe outlet upon the floor at the standpipe. The ball closes the drip valve outlet when more than nominal pressure is applied, but permits the escape of leaking water when the pressure is insufficient to lift the ball off its seat. All alarm valves and standpipe risers are equipped with 6-in. insulating joints. The sprinkler system was installed by C. H. Cronan, Boston.



Light and Power Cable Runs from Substation to Shops

Fourteen squads of six men each are organized for fire fighting in the paint shop and the same number in the woodworking building. Four similar squads also care for yard fire fighting. In general the squads each are headed by a chief under whom are two hosemen, one nozzle man and two valvemen. Fifteen Gamewell fire alarm boxes with auxiliary whistle signal and connections with the Malden fire alarm signal system are in service in the shops and yard. There is also a special city box at the gate house. The shops are provided

with a Western Electric interior communicating telephone system. H. G. Noble is superintendent of the Everett shops and John Lindall superintendent of rolling stock and shops. Acknowledgments are due to A. J. Blackburn, architect of the maintenance department, and J. Walter Allen, electrical engineer of the company, for assistance in the preparation of this serial.

The substation and boiler house is large enough to meet the ultimate needs of the shops, and as new buildings are erected and equipped, the addition of another boiler battery, a frequency converter, a third high-tension cable and further switching, feeder and control equipment can readily be made. The electrical distribution system of the paint shop, wood mill and lumber buildings typifies that to be installed in the future metal-working shops. The future fire protection system is based upon extending the present connections with the city mains, pumping installation and piping on the property.

Selling the Philadelphia Stock Issue

LEAFLETS and car cards were used to advertise the issue of $3,000,000 or 7 per cent preferred stock of the Philadelphia Rapid Transit Company, recently sold to car riders. The result, as mentioned in the news columns of this paper on March 7, was that the issue was oversubscribed within less than a week from Feb. 22, when the stock was offered. Individual subscriptions were limited to ten shares and were accepted only from residents of the city. Altogether the company received applications from approximately 14,000 persons, representing more than 300 different occupations.

Applicants for stock were allowed to hand their subscriptions to any P. R. T. conductor or subway-elevated cashier on blanks distributed on the cars and in the stations. No cash payment was received. Instead, the company agreed to notify the subscriber when he should begin payment and he then might pay at the rate of $1 per share per week, or in full. No interest was charged for deferred payment.

The form of application blank is shown in the accompanying illustration. It was a part of a six-page folder of "Service Talks." The car cards and dash posters carried such statements as: "Invest in a Growing Concern, Buy P. R. T. Preferred Stock," "One Dollar Will Start You to Ownership in P. R. T.—*Service Talks* Tells How." The cards were changed after a three-day display, and each set with a different color. In a radio talk on Feb. 28, J. M. Shaw of the company announced that 30,000 subscriptions had been received for more than the entire issue. This fact was also carried on car cards, shown in the cars on March 1.

PHILADELPHIA RAPID TRANSIT COMPANY
Securities Department
1520 Spruce Street, Philadelphia.

I hereby make application to purchase.....shares, when authorized, of 7% Cumulative Preferred Stock of Philadelphia Rapid Transit Co. at $50 per share, par value, for which I will pay as stated in Service Talks 85. (Mark cross at 1 or 2 as selected, viz: ☒)
(Not more than 10)

☐ 1. When notified, I shall begin payment of $1 per share per week to any P. R. T conductor or subway-elevated cashier

or

☐ 2. When notified, I shall pay $.....in full and receive.....shares.

(Print or write plainly)
Applicant's Name.....
Applicant's Occupation.....
Street and No.....
City and State.....

I certify that the above applicant is a P R. T. car-rider:

Employe's Name.....Badge No.....

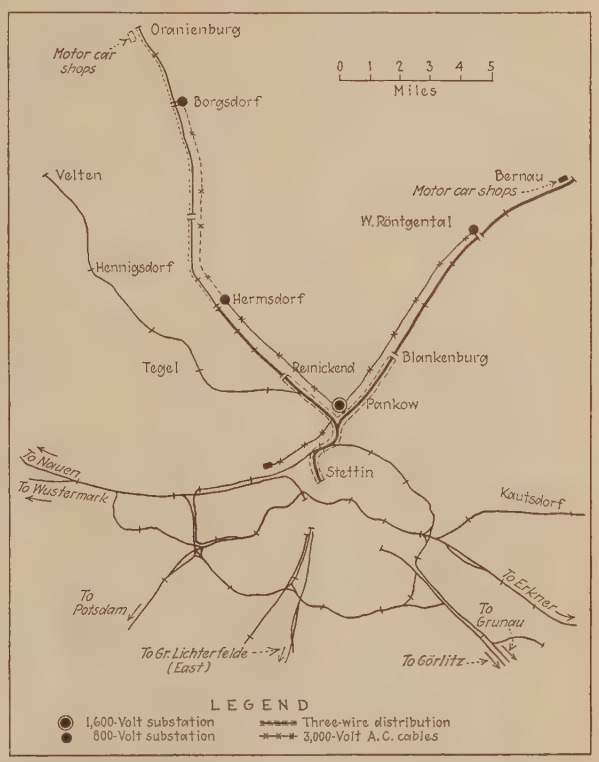
NOTE—Hand this card to any P. R. T. conductor or subway-elevated cashier, who will sign and turn it in to the company

Subscribers for P.R.T. Stock Used a Blank Like This

Berlin Suburban Electrification Put in Operation

Three-Wire Distribution Is Used for Busiest Section of 800-Volt Third-Rail Division—Train Units Are Made Up of a Motor Car and Two Trail Cars

THE first electrified section of the Berlin suburban lines, between the Stettin station (in northern Berlin) and Hermsdorf, was put in operation on Aug. 1 1924. The extension to Oranienburg will be in operation some time this year, to be followed by electrification of another branch from the same terminal to Tegel, Hen-



The Distribution of Electrical Energy to the New Berlin Suburban Electrification Is Partly at 800 Volts and Partly on the 800-1,600 Volt, Three-Wire System

ningsdorf and Velten, according to Public Works Commissioner Gebauer, writing in *Verkehrstechnik*.

Power for propulsion is delivered at 800 volts direct current. This was determined largely by the lower cost of d.c. motor cars. However, a third rail was chosen for conducting the energy owing to the likelihood that high-voltage alternating-current will eventually be used over the same tracks for trunk-line operation.

Energy is transmitted from the Berlin Electricity Works plant at Moabit at 30,000 volts, 50 cycles to the chief substation at Pankow, whence it is transmitted to the other substations shown on the map. Distribution from Pankow is on the three-wire principle, the third rail for one direction being served at 800 volts plus and the other at 800 volts minus. The running rails serve as neutrals. This balanced system was chosen to keep down electrolysis and reduce power losses.

The other sections use two-wire distribution because the loads come too infrequently to attempt balancing;

and as they run through the outer districts, less elaborate precautions against electrolysis suffice.

The electrification plans figure a maximum train density of six per hour each way on the Bernau division and eight per hour on the Oranienburg division. Train weight empty was taken at 270 metric tons and train capacity as 1,500 passengers. The speed on the outer sections, based on a rate of acceleration of 0.3 meter per second per second, is 70 km. per hour (43.4 m.p.h.) maximum and 40 km. per hour (24.8 m.p.h.) average schedule on the basis of 1,900 m. (6,232 ft.) spacing between stations. This schedule is about 30 per cent faster than was used formerly with steam.

The substations contain the following equipment:

Station	Rotary Converters Number	Capacity, Kw.	Manufacturer	Total Station Capacity, Kw.
Pankow	3	2,000	Bergmann	6,000
Hermsdorf	3	1,500	A. E. G.	4,500
Röntgental	3	1,000	Brown-Boveri	3,000
Borgsdorf	3	1,500	Pöge	4,500

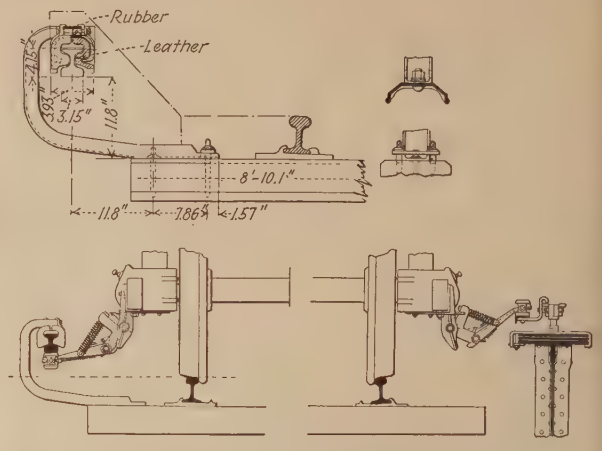
The under-contact third rail is used as a measure of safety. Because of the limited clearances the conductor is of the special type shown. Its weight is 40 kg. per meter (approximately 80 lb. per yard), its height only 105 mm. (4.15 in.) and its cross-section 5,100 sq.mm. A soft Krupp steel is used with high conductivity. Its resistance is 8.9 times that of copper. The construction permits additional conductivity to be obtained by adding strap aluminum or copper to the base of the rail.

The third-rail insulators have leather inserts between rail and insulator and insulator and cap for their mechanical protection; also rubber at the junction of the insulators to prevent the intrusion of water. These insulators are installed at intervals of 15 m. (49 ft.), the length of a third-rail section.

For the return circuit, the running rails have been fitted either with welded terminal flexible bonds or different kinds of galvanized contacts. Copper cross-bonds are installed at intervals of 150 m. (492 ft.).

Station lengths and limitations in loading and unloading time fixed the train length as 140 m. (459 ft.). Hence the chief improvements as regards capacity and speed of passenger interchange came through the adoption of sliding in place of swinging doors and a better arrangement of compartments.

For test purposes orders were placed for five different trial trains of like over-all dimensions and electrical equipment. Each train has halves about 70 m. (230 ft.) long. Each half train has four motors, two on each end truck. Since a weight of 17 metric tons per axle was required for most efficient motor use, the motor car had to be 20 m. long. This left 30 m. for the trailing portion. As that length was considered too great for a



An Under-Running Third Rail of Special Design Supplies the Electrical Power. The Shoes Are Also Adaptable to Over-Running Contact

body on standard four-wheel trucks and not enough for two cars on such trucks it was determined to use three two-axle 10 m. (32 ft. 9 in.) trailers to each motor car.

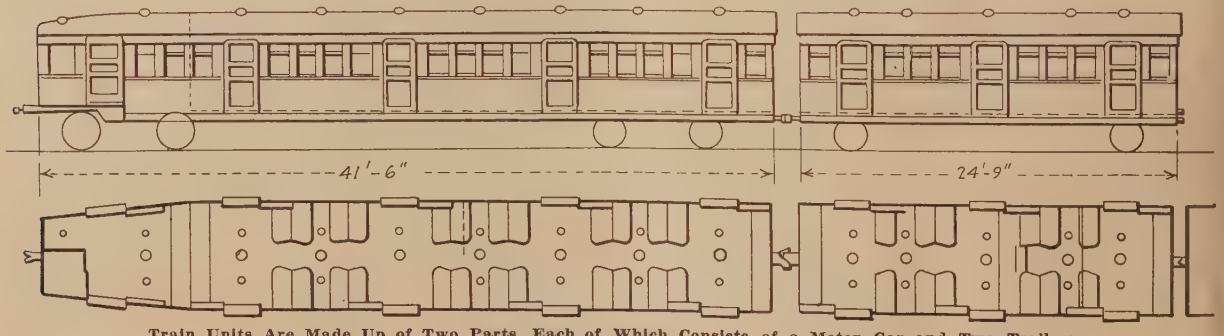
The use of 850-mm. (33-in.) wheels enables the passengers to step directly from the station platform 760 mm. (30 in.) high into the cars, except that 1,000-mm. (39-in. wheels) are necessary at the motor-truck ends. However, the portions over the trucks are used only for motorman's and baggage compartments.

The cars have steel frames with welded side sheathing, but the roof and interior are of wood.

Following trial of these trains, choice was made of the design shown in the accompanying plan. The motor car is 20 m. long, has five doors per side and seats 66 passengers. The trailer is 10 m. long, has three doors per side and seats 36 passengers. A complete train made up of these units seats 474, but has a carrying capacity of approximately 1,500. The weight of a motor car is 45 tons empty, of which the electrical equipment is 13.5 tons. The weight of a trailer is 15 tons.

It is intended, however, to go to four-motor cars later in connection with two trailers of greater length, so that the train make-up will have greater uniformity and there will be less gap between station platform and car body on curves than is now necessary with the extra long cars.

The present two-motor cars are fitted with two field-control motors rated at 230 hp. each at 630 r.p.m. on an hourly basis and 132 hp. each on continuous running. A gear and pinion drive is used on each side. Ball bearings have been definitely adopted for the armatures, while ball-bearing axle journals are on trial.



Train Units Are Made Up of Two Parts, Each of Which Consists of a Motor Car and Two Trailers

Precast Concrete Paving

Reinforced Slabs Used by the Willapa Electric Company Permit Rapid Construction Without Interruption to Traffic—Paving Maintenance Costs Are Less —Noise of Operation Has Been Reduced

A METHOD of track construction using precast slabs of reinforced concrete for paving between and alongside the rails was tried recently by the Willapa Electric Company, Raymond, Wash. This experiment was made because the railway anticipated serious settlement on the streets where the paving was to be installed. It was thought that during the period of settlement paving of this type would be preferable to monolithic concrete. The new pavement has proved so satisfactory in this location that it is now planned to extend its use to other places.

That portion of the city where the precast paving has been installed is built on tideflats adjacent to Willapa Harbor. Formerly these tideflats were badly cut up by deep tidal sloughs, and streets and sidewalks were constructed originally on pile trestles. Third Street, where the slabs were used, was constructed for over a block across a slough varying in depth from 10 to 35 ft.

These tideflats in the business section of the city were filled by a suction dredge, which at the same time deepened and widened the channel in the harbor and river. Material pumped from the bottom of the river varied from fine silt to rather coarse gravel, and during the filling process the heavier material was deposited near the end of the discharge pipe. When it was proposed to pave the street it was realized that with such a spotted fill, varying irregularly in depth, there certainly would be considerable settlement.

All piling under the old wooden streets and side-

Repaving the Track Area in Raymond, Wash., by Using Precast Slabs of Reinforced Concrete

No. 1. Placing concrete paving blocks by means of bars and hooks through the lifting rings.

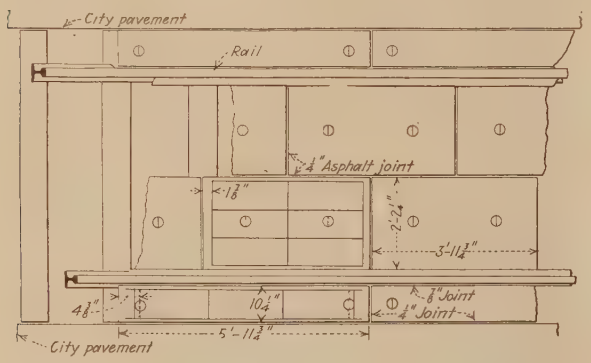
No. 2. Blocks are easily placed and no interruption to railway traffic occurs when this type of paving is used.

No. 3. Square wooden fillers are used alongside the rail to make a flangeway for car operation.

walks was cut off at a depth of 3 ft. below the elevation of the subgrade for the pavement, and sufficient additional material was brought in to care for what settlement had taken place during the period of about 18 months between the time the fill was completed and the paving work commenced. The city constructed an 8-in. concrete pavement on each side of the street and left a 7-ft. slot in the center for the track. Rails were not laid until after the city's paving had been completed. Under the edge of the pavement on each side of the track space an inverted curb was built.

The railway felt that it would be injudicious to construct any rigid type of track on a subgrade of this kind. With this in mind the precast slab pavement was developed. A design furnished by the Portland Cement Association was somewhat modified by the railway's engineers and was amended again in certain respects to incorporate suggestions made by engineers of the State Highway Department.

In constructing the track the subgrade in the 7-ft. space was lowered sufficiently to provide for a layer of crushed rock ballast underneath the 6-in. x 8-in. x 6-ft. 10-in. fir ties and 60-lb. A.S.C.E. rails which were used. After the track was surfaced fine crushed



Arrangement of Slabs Along and Between Rails

rock was filled in between the ties and brought to a level with the tops of the ties and rammed in place. This was done on the theory that if the ties settled under the weight of the traffic, the slabs would get added support from the rock between the ties. This practice, however, would not be recommended to be followed in locations where water would be apt to collect in the rock and freezing temperatures be encountered.

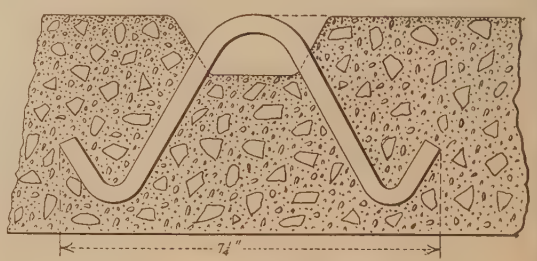
Slabs were made by a local concrete products company. They were poured on a wooden platform with partitions arranged to provide the proper sizes. Two rows of slabs each 22¼ in. wide and 4¼ in. thick were laid between the rails with joints staggered, while one slab 10¼ in. wide was laid on the outside of each rail. The slabs used between the rails are 3 ft. 11¾ in. long

Appearance of the Pavement Made of Precast Concrete Slabs Used in Raymond

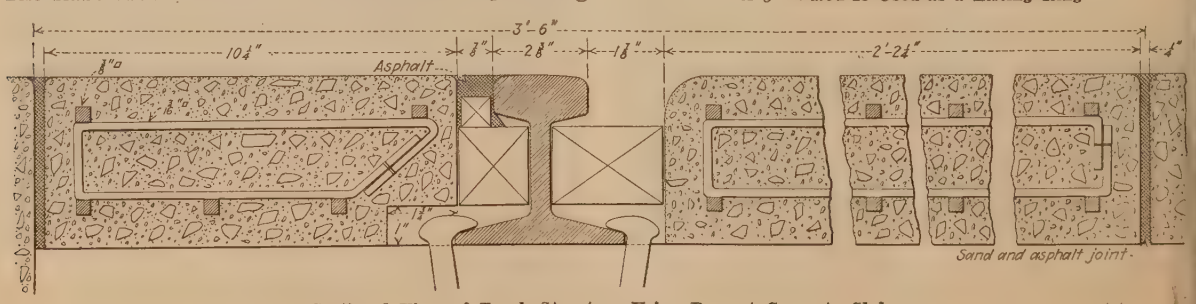
and those on the outside of the rails are 5 ft. 11¾ in. Use of these lengths gave a little leeway in making joints as ties were spaced on 24-in. centers and kept the slabs from "creeping ahead" when they were being laid.

Wooden filler strips were placed against the web on each side of the rail, the inner one being of sufficient width to provide a suitable flangeway. Joints between the slabs were partially filled with dry sand and then poured with hot "D" grade asphalt. The narrow slabs outside the rails were notched to allow space for the spike heads and were set far enough back from the rail to allow space for angle bars and gas-welded bonds on the rail head.

Two lifting rings were arranged in each slab as shown in the accompanying drawings. Crowbars passed through these rings furnished an easy method of lifting and placing the slabs. Moreover it was possible to lay the entire pavement without interruption to traffic. Its construction is such that maintenance is very easy and inexpensive. An additional advantage which the railway finds in this design is a reduction in the noise of operation.



A ⅝-In. Rod Is Used as a Lifting Ring



Sectional View of Track Structure Using Precast Concrete Slabs

Association News & Discussions

How Utilities Can Gain Greater Public Confidence

Better Service and More Frankness Are Urged at Joint Convention of Illinois Utilities Associations—Railway Men Discuss Many Operating and Maintenance Subjects

SPEAKING before the annual joint convention of the Illinois Gas, Electric and Electric Railway Associations, held in Chicago on March 18 and 19, Martin J. Insull, president Middle West Utilities Company; William A. Baehr, vice-president Illinois Power & Light Company, and John F. Gilchrist, vice-president Commonwealth Edison Company, emphasized the need for utility management founded on the broadest interpretation of the terms service, frankness, fair dealing and individual responsibility. The spirit manifested by these executives permeated all the proceedings and was voiced by speakers at the various sectional meetings. Nearly a thousand delegates and guests manifested an unusual interest in the program, and at the dinner on Wednesday evening the facilities of the Sherman Hotel were taxed to the limit by the unusually large attendance.

Status of "Big Business"

"Many speak of big business," said Mr. Insull, "but few understand it." He pointed out that the early promotional period of expansion from individual craftmanship to modern industrial efficiency, made possible by large concentrations of capital and engineering talent, had been accompanied by abuses and lax business principles. Today modern business is still laboring under the burden of popular prejudice and suspicion born in that early period. This prejudice can be obliterated only by the utmost frankness and fair dealing. Whenever the public finally understands the principles on which modern big business is conducted its attitude will be fair. He held that business must deserve public confidence before it can be gained, and pointed out that the modern business conception of service is most highly developed in the utility industry. Recognition by the public of this fact, he maintained, will wipe out popular suspicion engendered by the monopolistic nature of the utility business.

This same thought was voiced by Mr. Baehr, who called attention to the increasing responsibility which, under present-day conditions, rests upon each individual employee.

This individual responsibility, he said, increases as the process of concentration into large groups of properties continues. Unless the individuals in the industry recognize the importance of their function as humanizing agents in their contacts with the public the friendship and confidence so necessary to success cannot be acquired. Mr. Gilchrist advocated caution and vision. He warned against the dangers of going ahead too fast in power development at high construction prices when capital seems easy to get. On the subject of public relations work, he said that this phase of the utility man's business must not be lost sight of in the stress caused by increasing complexity of the technical problems that arise.

Railway Sessions Reflect Modern Thinking

In the railway section meetings, held during the afternoons of the two-day session, a modernized point of view stood out, not only in the discussion of general management subjects, but it was reflected also in a widened conception of individual responsibility on the part of those charged with maintenance duties. In the treatment of the many subjects discussed the relation of each department's work to the general objective of making friends for the utility and building a better and at the same time a more profitable service was constantly emphasized.

D. W. Snyder, Jr., vice-president Illinois Traction System, discussed the subject of merchandising electric railway transportation. He divided this subject into three phases, namely, methods of holding present passenger business, steps to be taken for regaining business lost in the past, and then measures for building up new business.

Vicious Circle of Economy

"First of all," he said, "it is necessary for each road to set its own house in order if it expects to hold its present business. He then pointed out that when the advent of the automobile had been followed by shrinking railway passenger business, this condition had been met with operating economies and curtailed service, which simply tended to drive more business to the automobile and the bus. Instead of building up gross revenue by giving improved service and then utilizing active and intensive modern selling methods, the vicious circle of economy had been continued, until the condition brought about by deferred maintenance threatened to put many lines out of business entirely.

There must be a service to sell, Mr. Snyder insisted. Clean, attractive cars, courteous employees and service that fits the transportation requirements of the community represent the railway man's stock of goods, and no amount of intensive selling will be productive of permanent returns unless the goods are right first. He said that more business had been driven from electric railways by bad public relations than by any other one cause.

A concrete example was cited of the experience of the Illinois Traction System following the introduction of modern merchandising methods. A faster and improved service was installed on the main division of that road, which resulted in an immediate increase in gross revenue of $11,600 for a three weeks period. In studying the subject of increasing passenger business, he said his property had found that if it could increase the number of passengers carried on each trip by only two, the operations would show splendid dividends. In this connection, he maintained that few electric railways have more than scratched the surface of the possibilities for merchandising their service.

A similar point of view was taken by J. F. Egolf, general manager Aurora, Elgin & Fox River Electric Company. He said that co-operation between the company and its employees was of utmost importance in attempting to merchandise electric railway service. This merchandising, in the last analysis, is done by the employees, according to Mr. Egolf, and if it is to be done successfully, they must first be put into the proper frame of mind regarding their relations with their company and the patrons of the line. This necessary spirit, he said, grows from confidence in the company and its management. He added that nothing could fully take the place of personal contact in winning this confidence.

Four Kinds of Advertising

John J. Moran, commercial manager Chicago Rapid Transit Company, discussed the importance of various forms of advertising in selling electric railway service. Such advertising, he said, takes four general forms, each of which requires distinct treatment. These he divided into advertising of the community itself, selling the service of the company to the housewife and business man, building employee spirit and morale, and safety advertising. He showed many interesting examples of the use of posters, executed with a high degree of artistic skill, and said that these frequently find their way into schools, clubs and other places where ordinary forms of advertising would not be permitted. In addition, he showed many examples of newspaper copy, prepared for the various specific purposes previously outlined.

Other Ways of Building Business

Other phases of electric railway business building were discussed by repre-

sentative men of the state. A paper was presented by J. R. Blackhall, general manager Chicago and Joliet Electric Railway, outlining the effects of automotive competition on that property. He pointed out, however, that the trend of traffic has recently taken an upward turn. Indications are that the cost of operating a private automobile will rise, and this should increase the use of electric railways.

G. A. Mills, vice-president and general manager Kewanee Public Service Company, outlined the experiences of one of the smallest railway properties in the state in putting its business on a profitable basis. This property has been rehabiliated after having ceased operations for fourteen months, during which period transportation was furnished by buses. When the railway was put back into service track layouts were revised, existing track was rebuilt and a 10-cent cash fare with eight tokens for 50 cents was put into effect. In addition, a $1 weekly pass was sold. In this town of 20,000 population approximately 500 passes are in use and about 20,000 tokens are in circulation. Good public relations have followed the re-establishment of the railway service, according to Mr. Mills. He attributed the difficulties of the previous company primarily to misunderstanding with the community.

Results accomplished through the installation of modern light-weight, one-man interurban cars on the Illinois Valley Division of the Illinois Traction System were described by F. E. Fisher, general manager of that division. He said that when these cars were first received the trainmen had objected to their use, but that determination on the part of the management to improve the service has finally demonstrated that they were entirely practicable. Seventeen of these cars which have been in operation since last August are now showing that this form of equipment results in increased total riding and at the same time makes large savings in expense, so that net earnings are considerably higher than with the old equipment.

Mr. Fisher described a form of bus competition which is still felt to some extent in his territory, and which, he said, seems to be beyond the pale of regulatory control. The bus driver, under this plan, puts himself within the classification of a contractor's agent, by arranging to haul certain individuals in the morning and at night between their homes and work, without engaging in a general passenger transportation business that subjects him to regulatory commission control. He said that the improved type of equipment and service offered by the railway was successful in making inroads on even this form of competition.

Status of Buses and Railways

The general subject of buses in their relation to electric railways was further discussed by W. H. Sawyer, president East St. Louis & Suburban Railway; B. W. Arnold, manager motor coach department Chicago, North Shore & Milwaukee Railroad, and M. L. Harry, division manager Illinois Power & Light Corporation, Decatur, Ill. Mr. Sawyer explained that the relations between bus manufacturers and electric railways have undergone a decided and definite change since the beginning of this form of competition. He said that at first the bus was the outgrowth of the jitney, and in this early stage the bus man didn't care particularly about his relation with the railways and openly said so. This situation was followed by an increasing recognition of the importance of the electric railway as a future operator of buses and a period of active discussion of the various phases of the relations between the automotive industry and the railways. During the last few months, according to Mr. Sawyer, the situation has entered a new phase. He called attention to the resolutions adopted by the American Electric Railway Association at the recent Midyear Meeting in Washington, and also to the statements made there by Mr. Dahl, speaking for the National Automobile Chamber of Commerce.

Mr. Sawyer said that the electric railways and the automotive industry have come to an understanding regarding the general principles upon which their relations should be founded, and urged that electric railway operators assume that the bus manufacturers would in general adhere to the spirit of this understanding. He implied that although individual manufacturers may in some cases fail to adhere to the code advocated and adopted by their own organization, such incidents may be expected to disappear rapidly as the value of full and whole-hearted co-operation becomes increasingly evident.

Mr. Arnold described his early attitude toward buses, when he first experienced the effect of unrestricted competition, and outlined some of the mistakes made by the railways in coping with this new competition. He said that buses as feeders to electric railways have three functions to perform: To serve the territory adjacent to the rail line; to add revenue to the rail line by directly feeding passengers to it; to help give a complete transportation service in a given community so as to improve the relations between the electric railway and the public. He urged that careful surveys be made before starting bus service in new territory, and then advocated that this service, when installed, be made as complete and frequent as possible in order to win the support of the people in the community. He decried the tactics of some high pressure truck salesmen in painting over-optimistic pictures of the possibilities of bus operation, and said that as a result of these tactics many bus lines have been installed in locations where they cannot be successful.

Conditions under which a combined bus and railway service was installed in Decatur, Ill., were described by Mr. Harry. He said that in this city of 50,000 people there is only about 15 miles of street railway track, and that consequently several parts of the community were not properly provided with transportation. As a result of this condition the growth of independent bus operation had been welcomed by the community, and this operation soon reached a scale which required serious consideration by the railway management. The railway finally purchased all the bus lines, substituted fifteen new buses for the old ones that had been in service, and with the co-operation of the city administration, instituted a joint service of railway and bus lines, with universal transfers. Buses are now operated over 10.5 miles of route.

Various phases of electric railway maintenance were presented in papers by J. I. Catherman, engineer maintenance of way Illinois Traction System; F. V. Skelley, superintendent Tri-City Railway, Rock Island, Ill., and T. H. Shaughnessy, assistant superintendent of shops and equipment Chicago Surface Lines. These papers are abstracted elsewhere in this issue.

At the conclusion of the meeting on Thursday, the following officers were unanimously elected for the coming year: President, J. F. Egolf; first vice-president, C. G. Handshy; second vice-president, G. W. Welsh; secretary-treasurer, R. V. Prather. G. A. Richardson, Arthur D. Mackie, R. C. Roderick and D. W. Snyder, Jr., were elected members of the executive committee.

Safety as a Means of Reducing Insurance Costs*

By Charles B. Scott
Bureau of Safety, Chicago, Ill.

THERE is a very definite relationship between the two terms "safety" and "insurance" which is not well understood nor appreciated by the public generally. Many of the insured interpret their insurance to mean, literally, a system by which they may be relieved from losses in excess of premiums paid by them.

Insurance companies are really trustees or custodians of certain funds collected in the form of premiums. If you carry insurance, then eventually you must pay your losses plus the expense of administering the insurance fund plus a reasonable return to insurance company stockholders. You, as an insured, may be faced with a catastrophe when others insured with you will take on their proportion of burden and relieve you of having to bear it all at once, but if you live long enough and continue your insurance, you will pay back year by year until you yourself have paid all your loss.

There is only one possible way by which you can reduce your insurance costs, and that one way is by reducing your losses. There is only one way by which you can reduce your losses. You cannot do it by paying someone else to carry your risks; you cannot do it by having a lot of others in your line of business pay your losses and their; you can do it only by removing your hazards and improving your risks—by creating the "state or condition of being safe and free from danger and risk" which is safety, the literal definition of Safety.

The electric railway business is one in which the most diligent and close economy is obviously necessary. My purpose is to try to tell you how you can save some of the money you are

*Abstract of paper read before Electric Railway Section of Joint Convention Illinois Utilities Associations, Chicago, March 18-19, 1925.

paying out of your income for insurance costs and accident and fire claims. Most of you buy fire insurance, and your premiums amount to a considerable sum. Your rates on carhouses and rolling stock are high because your loss records on carhouses and rolling stock are bad. Your loss records are worse than they should be—there is a reason for it, and the reason is you are not constantly using earnest efforts to guard such property from fire loss. Not because you do not know how to protect your property, but because you do not ceaselessly follow up the things you know should be done.

There are two very important factors in the reduction of fire losses, namely, the physical condition of the property, and the care exercised by those in charge of it. Good housekeeping and training of employees in carefulness are simple methods of avoiding fires. Careless housekeeping and careless men are largely responsible for the high rates you are paying for fire insurance on your carhouses and equipment. If every electric railway company would seriously and earnestly get to work on these two hazards and keep at it, insurance companies would gladly reduce the rates. They would much rather have a good risk at a low rate than a bad risk at a high rate.

Some electric railway companies carry workmen's compensation insurance. Everything that has been said about economy in fire insurance applies as well to compensation insurance costs—your property and your men—good housekeeping and careful men. You have the same opportunity for reducing your compensation costs.

There is another class of protection which you are compelled to carry yourselves because you cannot buy it. Insurance companies will not accept the risk. This is your risk for liability on account of injury to the public and damage to public property. Unfortunately, this is a risk in which you and your organization do not bear all the responsibility and one which is largely not under control of the management. Fortunately, the public conscience is becoming aroused to the criminality of carelessness. That consciousness is going to help some.

Children are being educated in safety. When they grow to be the men and women of the day, that is going to help greatly. Your industry has had much to do with the present interest by the public and by school children in safety. No industry has been more diligent than the electric railways in trying to enlist public interest and cooperation in safety. You were the pioneers in the work. You have worked hard and it is certain the public is appreciative of your efforts. Results may be slow in coming, but they will come surely. Safety is the best insurance.

COMING MEETINGS
OF
Electric Railway and Allied Associations

April 9—Central Electric Railway Master Mechanics' Association, Fort Wayne, Ind.

April 20-25—International Regional Planning Congress, Hotel Pennsylvania and Grand Central Palace, New York City.

May 5-8—Southwestern Public Service Association, Rice Hotel, Houston, Tex.

June 3-4—Iowa Electric Railway Association, Waterloo, Iowa.

June 26-27—New York Electric Railway Association, Bluff Point, N. Y.

July 22-25—Pacific Claim Agents' Association, Hotel Biltmore, Los Angeles, Cal.

Maintenance of Equipment in Chicago*

By T. H. SHAUGHNESSY
Assistant Superintendent Shops and Equipment, Chicago Surface Lines

ALTHOUGH many factors influence the cost of maintaining electric railway equipment and differences in schedule speeds, stops per mile, character of roadbed, weight of car and climatic conditions make it difficult to compare the results on one property with those on another, it may nevertheless be of interest to outline some of the practices in use and results obtained on this large property, where schedules are unusually severe and cars are operated over an extremely rigid roadbed.

We use a 5-in. trolley wheel. In 1924 the pounds of wheel used per thousand car-miles was 0.152, or an average of 6,578 miles per wheel. This represents 11.8 per cent increase in mileage over the results formerly obtained with a 6-in. diameter wheel.

The percentage of brake shoe wear to shoes applied for the year 1924 was 71 per cent and the pounds of brake shoes used per thousand car-miles was 39. This result was obtained mainly by close attention to the condition of brake shoe heads, hangers, brake beams and levers. Case-hardened bushings and pins are used in all moving brake parts.

On account of the rigidity of roadbed in Chicago, the wear on journal boxes has been severe and it has been difficult to keep covers tight. After using standard types of boxes, equipped with covers of various designs, with more or less success, a box was designed with a cover that fits in grooves on each side. A groove also extends across the lower edge of the opening and is cut away at the center to drain any water that may collect there. This cover is held in place by a ½-in. machine bolt and is lined with a piece of No. 515 oiled canvas, to prevent rattling and to keep out moisture and dust.

Case-hardened pedestal wear pieces are fastened to each side of the box. We tried electric welding, riveting and another scheme for fastening these wear pieces, but none of these methods was satisfactory. One of the truck manufacturers developed a means of holding the wear pieces in place by casting four lugs on each side of the box and bolting the plates to these with ½-in. bolts. This arrangement has proved successful. The pedestal jaws of the truck are also equipped with wear pieces made of 4-in. standard 5¼-lb. channels, case-hardened. All replacements can therefore be made at carhouses. The journal box wear plates, pedestal wear plates and bushings are hardened in our shops by the cyanide process in a special furnace. An article describing this furnace appears in ELECTRIC RAILWAY JOURNAL for Feb. 28, 1925.

The number of new rolled steel wheels installed and the number of pairs turned on this property are shown by the figures below:

WHEELS INSTALLED AND TURNED BY CHICAGO SURFACE LINES

Year	New Wheels Installed	Pairs of Wheels Turned
1921	8,723	15,238
1922	7,534	17,115
1923	8,451	16,215
1924	11,428	17,812

Open circuits which develop on armatures of various types due to the severe service and rigid roadbed in Chicago have been the subject of extensive investigation. Expansion and contraction of armature coils and leads were carefully studied. Armatures were tested at the shop to determine the effect of temperature changes on the coils. Current was passed through these coils to give temperatures as high as 125 to 130 deg. C. and the expansion of the core, coils and commutator was noted. It was found that the coils and cores expanded $\frac{3}{32}$ in. in a longitudinal direction. The expansion of the top leads in a radial direction was found to be as much as 0.022 in. Since these measurements were made with the armature stationary, the effect of centrifugal force was not noted. The tests made, however, show that there is a decided movement of the coils and leads.

Centrifugal force has evidently played a considerable part in causing the open circuits which have occurred on these armatures. Evidence of chafing between the top of the armature coils at the commutator end and the bottom of the upper leads indicated that there had been motion at this point. Wire bands have, therefore, been installed to bind down the coil extensions beyond the core so as to prevent them from throwing out against the top leads under the action of centrifugal force. This band is 1 in. wide and is located 2 in. from the end of the armature core under the top leads. It has been adopted on all armatures where the band can be held in place, the object being to allow the top leads to expand and contract as freely as possible.

The lay of the leads has been arranged so that they come out of the commutator bars straight and parallel

*Abstract of paper before Electric Railway Section of Joint Convention Illinois Utilities Associations, Chicago, March 18-19, 1925.

to the bars for a distance of not less than ⅛ in. In soldering the commutator, the solder is kept back for about ⅛ in. from the back end of the slot in the commutator bar. This tends to distribute any motion of the lead over some distance and prevents crystallization caused by confining this motion to one spot.

The following table shows the number of armatures rewound and repaired and their proportion to the total number of armatures on the system:

ARMATURE REPAIRS, CHICAGO SURFACE LINES

	Armatures Rewound		Motor and Compressor Armatures Repaired	
Year	Number	Per Cent Total	Number	Per Cent Total
1921.....	3,689	25.4	15,557	107
1922.....	3,923	27.6	14,604	103
1923.....	4,711	21.8	14,490	98
1924.....	4,359	28.5	14,499	94.7

In the last figures are included armatures sent to the shops for changing pinions and bearings, as practically all these changes are made at the shop.

Ordinary heat-treated carbon steel armature shafts were not standing up in Chicago service. Chrome nickel electric steel of the following analysis and specification has been used for all shaft renewals for several years:

Carbon	0.30 to 0.40
Manganese	0.50 to 0.80
Phosphorous	Not to exceed 0.04
Sulphur	Not to exceed 0.04
Nickel	1.00 to 1.50
Chrome	0.45 to 0.75
Physical.	
Tensile strength	90,000 lb. per sq.in.
Elastic limit	50,000 lb.
Elongation in 2 in.	22 per cent
Reduction in area	45 per cent

We have several hundred of these shafts in service and since their installation have never had a failure due to breakage. The effect of this improved material is given in the following figures showing the number of shafts renewed each year since 1921:

1921	1,576
1922	1,717
1923	1,058
1924	858

Budgeting Overhead Line Maintenance*

By F. V. Skelley
Superintendent Tri-City Railway, Rock Island, Ill.

UNDER modern methods of handling finances a railway manager must know each year how much money is needed in each of his departments. To prepare the budget for the overhead department the engineer must determine first the amount of repairs actually needed and then estimate, for each job, the labor costs, the material to be purchased, the material on hand and paid for and the value of scrap trolley, brass and poles taken down.

Speaking from the standpoint of the road with 100 miles or less of trolley, opinions vary as to the best method of obtaining the information necessary to make out a definite plan for repair work. One thing is certain, that with 100 miles of trolley in service 8 or 10 miles must be replaced each year. The age of the wire means nothing, for on some lines No. 00 trolley has been up for 22 years and yet during that time it has had less than 500,000 car movements under it. You cannot allow a wire to wear out, for that means trolley breaks and interrupted service. In measuring 100 ft. of worn trolley wire with a micrometer I found that there was a variation of 25 per cent in the diameter of the wire.

The maintenance crew of a line department may properly consist of a foreman, two linemen and a groundman. An experienced driver is necessary to handle the 2½-ton line truck, as he is usually working in traffic and must occasionally pull a trailer. Under ordinary conditions this crew should do all the maintenance work on 100 miles of trolley for nine months of each year. During the summer months a second crew is necessary for stringing difficult pieces of trolley.

The small or average-sized road cannot go to the expense of holding a maintenance crew in readiness for an emergency, so the line foreman should keep a central telephone operator informed at all times of his location, and an emergency call can be relayed to the nearest carhouse, where a waiting automobile is ready to go for the crew. Supervisors, or other road men, should be able to clear the line in an emergency.

The largest part of the overhead investment is in the pole line, and the major part of these poles are of wood, which if untreated is subject to rapid deterioration when in contact with the soil. The decay of wood is caused by the growth and activity of fungi, which thrive in the soil and attack wood when air, moisture and heat are present. Every user of wood poles knows that the poles start to rot at the ground line where these conditions are to be found. The spores of the fungi germinating in the wood penetrate every part of the sapwood where complex compounds are formed, causing fermentation. Once started the action is rapid, as the wood fiber then becomes food for the fungi. There are several processes in use to prevent rot. Any method that will close the pores of the wood against moisture and air is beneficial. If a pole line is too far gone on account of rot below the ground line, the new pole should never be set in an old hole, as the fungi will immediately attack the new pole.

There is not much to say on the maintenance of iron poles. Paint them every six or eight years and they will take care of themselves. Thirty-foot tubular iron poles have been painted for $1.55 each, using a good grade of steel preservative and paying a painter 75 cents per hour and a helper 50 cents per hour. Bates expanded steel poles cost $1.65 per pole. All poles should be wire brushed to remove scale and rust.

Track Maintenance Practices*

By J. I. Catherman
Engineer Maintenance of Way Illinois Traction System

IN EITHER open track or paved track drainage is of utmost importance from the standpoint of satisfactory service and low maintenance cost. Without proper drainage, no track can be well maintained. Surface or subsurface water is probably the greatest enemy of good track. On open track drainage is obtained by properly shaping the ballast line, maintaining a proper shoulder on embankment and by keeping ditches open through cuts. In paved streets, a line of tile is located on either side, or beneath the center of the track, and connects to adjacent sewers. But the most effective measure in paved streets is to maintain the paving so that water cannot reach the foundation of the track. Once there, it is certain to cause trouble.

There are many other things which we must look to in properly maintaining open track. The rail, joints, ties and ballast make up the track structure, and on these four elements the bulk of the time of the trackman is spent. Little attention is necessary to the rail itself, so far as everyday maintenance is concerned. Primary attention is directed to keeping it in proper line and surface. Rail does wear out, however, and it will break after a certain length of time unless periodical renewals are made. If this is not given attention disastrous wrecks may be caused. We cannot tell when a rail is about to fail, and the only safe policy is to so shape our rail renewal program that such failures will be reduced to a minimum.

Neglected joints soon produce rough riding tracks. Passengers are quick to note lurching cars and money saved on joints is at the expense of passenger business. Poorly maintained joints give a greater opportunity for spreading rails, and many a truck spring has been broken by a low joint.

Oiling the Track Joints

About two years ago on the Illinois Traction System we started oiling our joints. We used Standard Oil Company No. 4 Road Oil, and we now have approximately 50 miles of oiled joints. We have found this to be most economical. On one section where we first started oiling I had a recent report that showed approximately one-half keg of bolts used on 5 miles of track for renewals this winter. This is less than 10 per cent of what would ordinarily have been used. Threads on the old bolts and nuts are preserved by the oil and can be readily tightened.

In the maintenance of ties, much money can be wasted or saved. A tie requires approximately one man-hour to install. It costs just as much to install a poor tie—one that will last but five years—as to install one that will last twenty years. It is becoming generally recognized that untreated ties are no longer economical. We began installing treated ties in 1910. Today more than three-fourths of our ties are treated. Renewals are becoming less each year. For 1925 our maintenance program

*Abstract of paper before Electric Railway Section of Joint Convention Illinois Utilities Associations, Chicago, March 18-19, 1925.

calls for 25 per cent less ties than it did in 1924, and I fully expect to see an equal reduction in 1926. What does this mean to us? Simply that this year we will install 15,000 fewer ties than we did last year and probably 75,000 less than would have been the case had we never installed treated ties. It is evident that the matter is worthy of the greatest consideration as a measure of economy. Ties are becoming more scarce and higher priced each year and we must look to the future when our yearly supply of ties is purchased.

Fortunate is the maintenance man whose track is ballasted with crushed stone or some similar material. A little labor on such track will go a long way. However, many of us must depend upon cinders and other inferior material. Cinders, especially those from a stoker fed furnace, are soft and often very fine. Consequently, they do not stand up under track like the heavier material. Crushed stone, slag, gravel, chatts, or some equal material, results in a very material saving in maintenance labor. Ballast must be kept clean and free from weeds. The latter hold moisture, and in addition to their unsightly appearance tend to produce more rapid deterioration of the structure.

Adoption of standard materials and standard methods helps to make better track at lower cost. Too many foremen are reluctant to give up old practices and prejudices. They must be made to appreciate the importance of their work and must understand that little things neglected make costs mount rapidly.

Labor-Saving Tools

The importance of tools as time and labor savers in the maintenance of way department is receiving more attention each year. On open trackwork five men with a set of tie tampers will tamp more track and do it much more efficiently in one day than will fifteen men by hand. Electric drills and saws are great labor savers. Welding outfits can save their original cost in a very short time. Cupped rails can be built up, frogs and crossings given new points and the gage intersections rebuilt at a small cost with welding equipment. We have many times built up crossings, solid manganese as well as bolted, and increased their life fully 50 per cent.

Maintenance men must be on the lookout continually for new ways of doing things, new ideas, new tools and equipment; devices that will save labor and also save material. These are the days of high costs and it is up to the man in charge of maintenance to keep those costs down. To maintain his track efficiently and well and at a minimum cost is his job, and it is up to him to keep himself educated to the modern ideas and ways of doing things. If he is not constantly on the lookout for new ideas, is not willing to accept them and give them a trial he is not on to his job. Those who most quickly and earnestly adjust themselves to the new conditions will be the first to increase the efficiency of their organizations, which will in turn be reflected in the general condition of their property.

Operating Improvements at Providence*

New Substation Equipment and Transmission Lines, a Block Signal System and Rehabilitation of a Power Station for Use of Pulverized Coal Earn 14.4 per Cent on Cash Expenditures

By W. C. Slade
Vice-President United Electric Railways,
Providence, R. I.

During the last three years the United Electric Railways has carried out a comprehensive program to enlarge and to modernize its power system. Studies were undertaken in the fall of 1921 which led to extensive purchases of equipment during the next two years and to active construction work over a period of three years which required appropriations totaling nearly $2,100,000. Of this, very closely $1,300,000 was for the power plant; $700,000 for substations, transmission and distribution feeders both overhead and underground; $100,000 for track-circuit block signal systems with automatic flagmen at crossings, and for construction and emergency tower trucks for the line department.

Woonsocket Division Power Development

A new semi-outdoor substation was built containing two 1,000-kw. rotaries, with space for a third. To serve this station a double-circuit No. 00 copper transmission line was built from Providence to Woonsocket, with four sectionalizing oil circuit breakers at Lincoln substation near the midway point. A 12-mile single circuit branch-off from this line at Lincoln substation was built cross country to Oakland automatic substation. At Lincoln substation two new rotary converters were installed, together with new switchboards for control of seven new outdoor oil circuit breakers, including the four sectionalizing breakers previously mentioned. Supervisory control apparatus has also been installed at Lincoln and at North Main Street substations, so that in the near future the seven oil circuit breakers can be operated over pilot wires from the latter substation, which is in Providence. All transmission lines and new oil switches and transformer equipment are built for ultimate operation at 22,000 volts, although at present they will be operated at 11,000 volts. This development made it possible for the United Electric Railways to supply its own power generated at its modernized power plant to a distant division for which power generated largely in an old steam plant in Woonsocket had been purchased for many years.

North Main Street Substation

A combined transmission switching and rotary converter substation was built on North Main Street in the city of Providence. The switching station, which contains entirely General Electric equipment, has a ring bus, sectionalized at four places, and provides for ultimately twelve oil circuit breakers of H-3 type. Bus and circuit breakers are on separate floors. At present there are eight breakers in service; two serving rotaries in the building, two serving the Woonsocket transmission lines, and four serving lines running to the generating plant and to Pawtucket substation. This switching station permits power to be trunked from the generating plant in large quantity, with a consequent material saving in number (and hence cost) of underground cables at a future time, to a convenient point for distribution as required over several transmission lines. Altogether, six substations receive power delivered over this ring bus. This rotary station is an all-Westinghouse station with two 2,000-kw. rotaries supplied by three-phase transformers, and there is space for two more similar units. The construction of this rotary substation made it possible to relieve the Pawtucket substation, which was seriously overloaded in winter, of approximately 1,000 kw., and to give much improved voltage to a section of the distribution system where poor conditions had previously prevailed. With improved voltage the important Providence-Pawtucket express service was also benefited.

Additional Equipment in City Substations

A new General Electric 2,000-kw. rotary and three-phase transformer were installed at Manchester Street substation to replace one of the two d.c. engine-driven generators that had to be scrapped when the generating plant was remodeled. A similar unit was installed in Olneyville substation after a 1,000-kw. unit had been transferred to the new Woonsocket substation.

Underground Conduits and Cables

A start was made to put certain important power circuits underground to replace existing overhead feeders with feeders of much increased capacity. Approximately 2.02 miles of trench of single and multi-duct tile and fiber conduit, totaling an equivalent of 23.9 miles of single conduit, has already been laid. In some of this duct space 2.65 miles of underground cable was installed. In addition, 1.55 miles of submarine cable was laid under the Providence and the Seekonk Rivers.

Block Signal Systems

Eight miles of single track and some double track on right-of-way on the high-speed line between Providence and Woonsocket were equipped with Union Switch & Signal Company's track circuit TDB signal system. Also the same manufacturer's automatic flagmen were installed at all highway crossings. Extensive repairs to signal trunking and ground circuits have been in progress on another high-speed road (Providence to Buttonwoods) and are now nearly

*Abstract of a paper delivered before the New England Street Railway Club on Feb 5, 1925.

complete. A number of additional Chapman automatic signals have been installed on city lines operated with one-man cars.

Rehabilitation of Manchester Street Power Station

The large amount of work at the Manchester Street power station was done both to provide additional dependable generating capacity and to introduce operating economies throughout the plant to as great an extent as possible.

It was decided to wipe out of existence the entire 8,000 kw. of engine-driven generating equipment and the entire low-pressure boiler equipment, retaining only for the time being the small 2,500-kw. turbine for stand-by service. This decision at once required practically the elimination of the original power-plant equipment and necessitated writing off our books in one lump sum approximately $633,000.

In the turbine room it was decided after careful study to install an 18,000-kw. General Electric turbo-generator with a Westinghouse twin jet condenser. This went in the same location previously occupied by one of the 2,500-kw., d.c. engine-driven generators. It is interesting to note that the generating capacity was increased sevenfold without any tax on additional building capacity, except for the small space occupied by a rotary converter and its transformer, pending the time when the substation equipment can be housed outside. In the boiler plant the space originally occupied by two decks of boilers of approximately 8,000 boiler-horsepower was used to accommodate ultimately four 1,266-hp. boilers set high in the air. Only three boilers were installed at this time.

Inasmuch as a description of the new plant in reasonable detail was published in the ELECTRIC RAILWAY JOURNAL of April 28, 1923, a detailed description will not be repeated at this time. Reference should be made to this article for details of equipment and the description of the method of handling and preparing the coal for burning.

Boilers Fired with Pulverized Coal

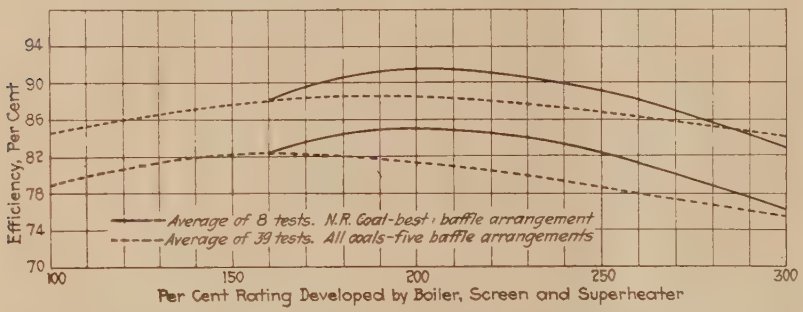
After one year's experience we believe that our decision to use pulverized coal under the conditions prevailing has been thoroughly justified. First of all, we expected to get better over-all boiler plant efficiency than we could get with stokers. The results obtained lead us to believe that we have done so. This increased efficiency has been due to the elimination of banking losses on the one hand and to the more efficient burning of coal on the other hand. One of our pulverized-coal-fired furnaces can be closed up tightly, like corking a huge thermos bottle, as there are no gases to contend with from a banked fire. For example: a boiler banked while the pressure was at 205 lb. showed 15 lb. pressure after a period of 24 hours, and some pressure after 48 hours. In burning the pulverized coal, the amount of excess air can be reduced with care to as low as 12 per cent or 15 per cent, and it is easy to operate with excess air ranging from 20 per cent to 25 per cent, which in itself spells efficiency. It is easy to maintain from 14 per cent to 15 per cent CO_2 in the flue gases leaving the boiler, and on test work 15 per cent to 15½ per cent CO_2 is often maintained throughout the test.

It was also expected that with pulverized coal boiler outage would be greatly reduced because as a rule in stoker-fired plants boiler outage is due more often to clinker trouble on the stoker or on the furnace walls than to trouble with the boiler itself. We have had a remarkable record during the first year of operation of our new furnaces and boilers. During this entire period we have not had to replace a single tube in any boiler, superheater or economizer. We had to reroll only two boiler tubes after the installation was started up. This speaks well for the equipment, for the workmanship of installation and for the favorable conditions obtained in pulverized coal practice. Also, during this entire period we have not had to renew any brickwork* in any one of the three furnaces, which together have burned now from 35,000 to 40,000 gross tons of coal, including 1,200 tons from Rhode Island.

The flexibility of operation of a pulverized-coal-fired furnace also appealed greatly to us. A furnace can be started quickly with pulverized coal. We put a stone-cold furnace on the line in 50 minutes and an idle but warm boiler was brought up to a fair rate of steaming within twenty minutes without difficulty. Boilers fired by pulverized coal can be banked instantly when desired. It is indeed necessary to guard against accidental banking due to any unexpected failure of the supply of electrical energy to the boiler plant for plant motors. The equipment must be mainly motor driven. It is advisable therefore to have the feeder motors and the primary air-pressure blower motors supplied either in whole or in part from an independent source—by use possibly of a suitable auxiliary steam-driven generator. These essential motors are really in about the same class with boiler feed pumps which are generally steam turbine driven.

Another consideration that we gave to our decision to use pulverized coal was the reduced ash to be handled as well as the ease with which it could be handled by mechanical means and with little labor. We ran our first boiler for five weeks before any ash was removed from the ash hopper. This was because we were burning a very low-ash coal. As a regular procedure, however, we now remove the little ash that does collect each day from the ash hoppers.

Finally, from observations that we had made in the West, we were convinced that by burning coal in pulverized form we could burn with practically equal efficiency low-grade coals and high-grade coals. In fact, we concluded that we could burn with high efficiency any coal that was worth shipping from the coal fields to New England. Our pulverized-coal-fired furnaces were designed to burn bituminous coal of 14,000 B.t.u. as fired with maximum capacity and maximum efficiency, and to burn anthracite coal with reduced capacity, but, we hoped, with reasonably high efficiency. During the past year we carried out a number of tests in burning Rhode Island coal. We found that we could not burn Rhode Island coal alone successfully because of the lack of volatile which is required to sustain combustion. We did find, however, that a small amount of bituminous coal with approximately 20 per cent volatile mixed with Rhode Island coal enables us to burn the mixture entirely satisfactorily and with high efficiency. We burned on many occasions mixtures containing as high as 75 per cent Rhode Island coal. On our test work, however, we confined our mixtures to those which contained 50 per cent and to those which contained 66⅔ per cent Rhode Island coal. Taking seven of these tests made with these mixtures, you will be interested to know that our unit efficiencies with economizer ranged from 84.4 per cent to 88.4 per cent. The over-all rating on the unit, expressed in terms of boiler rating for these same seven tests, ranged from 157 per cent to 272 per cent. The heat units in the coal mixture as fired ranged from approximately 10,800 B.t.u. to 11,600 B.t.u.†



Results of Boiler Tests with Pulverized Coal

No. 9, Bigelow-Hornsby 1,266-hp. boiler with Foster economizer.
Upper curves are for unit efficiency.
Lower curves are for boiler, furnace screen and superheater efficiency.
New River semi-bituminous coal, 30 tests.
Gas coal, Wise County, Va., two tests.
Combination of Rhode Island anthracite and New River bituminous mixed, seven tests.

*The deterioration of the front wall of the furnace had progressed further than realized when the paper was delivered, Feb. 5, so that on Feb. 18 it failed near the top to such an extent that it was considered advisable to remove all of the old wall down to the bottom of the lowest air passage. In places the brick had gradually spalled away, leaving only 2½ in. to 4 in. of material. It is believed that the refractory had in general wasted away by spalling rather than by slagging with molten ash. The wall is being rebuilt with improved construction and a still longer life is expected from the rebuilt wall.

†For further information regarding these tests refer to a paper presented by Henry Kreisinger before the A.S.M.E. at its December meeting in 1924.

It was once thought necessary to dry all coal to be pulverized and burned in pulverized form. In order to be on the safe side we installed waste gas driers in our boiler plant. We feel comfortable in having the driers available for use in case of emergency should the coal be excessively wet. We have not yet, however, been obliged to use our driers and we have burned a considerable amount of coal that contained between 4 per cent and 6 per cent moisture at time of milling.

We installed four Raymond six-roll mills rated at a ton per roll. We can pulverize sufficiently fine to burn efficiently New River and Pocahontas coal at the rate of 7, 8 and even 9 gross tons per hour, the output being reduced as the moisture in the coal increases. On the average it takes only 12 kw.-hr. per gross ton to mill this kind of coal. It is costing us less than 9 cents a ton to do the milling as far as power is concerned.

Although the plant has run a little more than a year, we have as yet no definite idea of what the annual maintenance will be because of the fact that we have not yet begun to renew some things which are subject to renewal. Thus far maintenance on the outside has cost us not more than 3½ cents per gross ton pulverized. Labor of milling is also reduced because the man on each shift who looks out for the mills regularly has other duties to perform throughout the boiler plant when not milling coal. Based on actual time employed in milling, labor costs approximately 5 cents per ton and not over 11 cents per ton with all idle time charged in.

Operating Results from the New Boiler Plant

All tests were carried out on the same boiler between the months of May and October, 1924. No changes were made in the boiler (known as No. 9 unit) throughout the test except in case of the baffling arrangement in the front half of the boiler. Altogether five different baffling arrangements were used, giving for certain arrangements relatively poor results and for other arrangements good or very good results. Baffling arrangement known as No. 5 gave the best results. I am showing you two sets of efficiency curves; one set representing the average of all 39 tests, good, bad and indifferent; the other higher set representing the average of the eight tests with bituminous coal carried out with No. 5 baffling arrangement. The two top curves represent over-all unit efficiency with economizer. The two lower curves represent over-all efficiency without the economizer. With the best baffling arrangement 90 per cent or better overall efficiency was obtained over a part of the curve from 175 per cent to 225 per cent of boiler rating; and 86 per cent or better from 150 per cent to 275 per cent of rating.

I have listed also the first fifteen most efficient tests, without consideration of the relation to the baffling scheme, the rate of steaming, the order of the test or possibility of gross error. Note that five tests run between 90 per cent and 93 per cent, and that the other ten run between 87 per cent and 90 per cent for over-all unit efficiency. Seven of these tests were made with the boiler ratings averaging between 200 per cent and 260 per cent of nominal rating. Note that throughout the tests the exit gas temperatures from the economizer were satisfactorily low, ranging from 250 deg. up to 300 deg. where the rating of the boiler did not exceed approximately 235 per cent to 240 per cent. Note also the high CO_2 in flue gas maintained throughout tests, ranging from 13.8 to 15.5 per cent.

As compared with these high efficiency figures on test, the average day-in and day-out over-all boiler plant efficiency for a period of 3½ months was found to be 85.3 per cent for the pulverized-coal-fired plant. This is to be compared with an over-all efficiency of 81.6 per cent for the new and old boiler plants combined during the same period. The efficiency for the entire boiler plant was pulled down because of stoker-fired banked boilers, a few of which were kept available for service during the testing period and during the time that the pulverized coal-fired plant was being tuned up, so to speak. At very poor efficiency we evaporated in the stoker-fired plant approximately 10 per cent of the total water evaporated, based on actual water fed to the boilers determined by meters. This indicates, therefore, that with the elimination of all stoker-fired boilers we can count on an over-all efficiency of the boiler plant of at least 85 per cent, averaged over a long period.

BOILER TESTS ON NO. 9 BOILER FIRED WITH PULVERIZED COAL, MANCHESTER STREET STATION, UNITED ELECTRIC RAILWAYS OF PROVIDENCE

Partial Summary of Fifteen Most Efficient Boiler Tests

Baffling Scheme	No. of Test	Per Cent Efficiencies Over-All Unit	Per Cent Efficiencies Without Economizer	Per Cent Ratings Boiler	Per Cent Ratings Boiler	Degree Temperatures Leaving Boiler	Degree Temperatures Leaving Economizer	Per Cent CO_2 in Flue Gas
5	31	93.0	85.6	206	224	537	268	14.6
3	14	92.0	84.8	173	188	520	258	15.0
3	15	90.7	82.9	210	229	582	288	15.4
1	3	90.5	84.8	141	151	450	223	14.7
3	16†	90.2	83.0	222	241	572	269	15.5
5	35*	89.7	84.0	148	157	490	242	14.0
5	29	89.7	83.5	166	179	491	242	14.7
3	18	89.4	81.5	173	190	573	269	15.0
3	20	88.7	81.8	162	175	524	254	14.9
3	17†	88.3	80.9	209	228	562	280	15.0
5	27	88.2	82.2	160	172	503	250	14.8
5	28	88.0	81.3	259	280	592	301	14.5
5	38*	87.9	80.2	248	272	578	304	13.8
5	36*	87.4	80.2	208	227	551	288	13.9
4	24	87.3	81.8	173	185	465	234	15.5
Partial Summary of Five Highest Rating Tests								
5	28	88.0	81.3	259	280	592	301	14.5
3	13	86.8	78.0	292	324	659	238	15.0
5	33	85.1	77.0	302	333	595	307	14.3
1	6	84.4	78.3	269	291	562	309	15.0
5	32	81.4	73.4	294	326	643	336	14.3

* Rhode Island half coal in mixture.
† High volatile (31.2 per cent) gas coal. All other tests, New River, W. Va., semi-bituminous coal.

A Discussion of Operating Results in Plant Economy

For a five-month period ending Nov. 30, 1924, the plant was run on 22,800 B.t.u. per kilowatt-hour generated, which is equivalent to 23,800 B.t.u. per net kilowatt-hour. The corresponding coal factors are 1.70 lb. per kilowatt-hour (net) and 1.63 lb. per kilowatt-hour (generated).

Based on these data, we feel that we may confidently expect to produce a net kilowatt-hour on 22,000 B.t.u. with 300-lb. steam pressure at the turbine throttle, with banked boilers eliminated and with machine hours of the vertical turbines further reduced. This, assuming for fuel 14,000 B.t.u. coal as fired, means 1.5 lb. per kilowatt-hour generated and 1.57 lb. per kilowatt-hour output. It is further based on the assumption that power generated per year will not exceed 75,000,000 kw.-hr., as the equipment performance at the time of designing the plant was predicated as a 70,000,000 kw.-hr. load.‡ The new equipment by itself will, of course, do better than this, as should be expected, based both on the excellent boiler plant efficiency and on the excellent water rate of the new turbine, which at its best point requires only 10.5 lb. steam per kilowatt-hour; at one-third load, 11.8 lb.; at full load, 10.65 lb.

Return on the Investment

From Jan. 1, 1918, to June 30, 1923, a period of 66 months, the average coal factor was 2.62 on the generated basis and 2.65 on the output basis. There has, therefore, actually been a decrease of 0.95 lb. coal per net kilowatt-hour and 0.99 lb. coal per kilowatt-hour generated. With the improvement in economy yet to be expected, this improvement is subject to increase. But let us take an even pound for conservative figuring. This means 31,200 gross tons coal saved per annum, on the basis of 70,000,000 kw.-hr. generated. At a cost of $6 a ton as fired, this represents $187,200 saved per annum. This, incidentally, is a return of 14.4 per cent on the cash outlay of $1,300,000. It is, however, a return of nearly 28 per cent on the increase in book value of the plant, after allowing for deductions for retirements.

Taking the entire power system development as a whole, we are now confident that with the proved success of the power plant job we will receive a return on the entire investment in excess of that originally hoped for, and equal to not less than 13½ per cent. This statement is made on the assumption that coal as fired at the power plant costs $6 per gross ton. Included in this investment are all non-revenue producing expenditures such as block signal system, underground conduits, etc.

‡The wide variation in the railway load curve with consequent unfavorable load factor is another element affecting adversely better performance.

Automotive Discussion at Brussels

THE rôle of the motor car in the economic development of the United States during the last two decades will be told in a report to be prepared by a committee of prominent Americans for consideration at the third general meeting of the International Chamber of Commerce at Brussels, June 21-27. Thirty-nine countries holding membership in the International Chamber will be represented at the Brussels meeting, at which prominence will be given to "Economic Restoration."

The general subject of motor transportation and highway development was added to the agenda of the Brussels meeting at the solicitation of the American Section. In the opinion of the American Section, the economic and social effects of the development of motor transportation in the United States have been of such great importance that a representation of the past and present American situation would be of great benefit to European delegates.

Roy D. Chapin, chairman of the board of the Hudson Motor Car Company, has been named chairman of the committee which will draft the report. Particular stress will be laid upon the use of motor transportation in supplementing the existing lines of rail and other transport. The question of highway development will also be covered in the report. The experience of the United States in the matter of "Rules and Regulations" of traffic and taxation of motor vehicles will be put before the Brussels meeting.

Tramway and Bus Relations

THIS subject came up at the annual meeting of the Tramways and Light Railways Association in London, England, and was discussed by many distinguished railway officials. It was the general opinion that the tramways were the only solution of the traffic problem, both from the economic and financial point of view, and that while the motor bus should be used extensively in auxiliary service, it was incapable of handling mass transportation.

National Association of Purchasing Agents

THE tenth annual convention of the National Association of Purchasing Agents will be held in Milwaukee May 25-28, inclusive. An exhibit will be held in connection with the convention. W. L. Chandler, Woolworth Building, New York, is secretary of the association.

Utility Men to Meet with Advertising Clubs

EXECUTIVES of public utility companies will take an important part in the convention of the Associated Advertising Clubs of the World at Houston, Tex., May 10 and 15, according to an announcement by William H. Hodge of Chicago, president of the Public Utilities Advertising Association. The public utility men will hold two sessions of their own. Subjects to be discussed are, "Costs and Results," "Better Copy," "Keeping an Organization Abreast of Its Advertising," "Motion Pictures," and "Good Will and Institutional Advertising."

Russians Hold Tramway Conference

THE second all-Russian tramway conference was held in Leningrad on Jan. 25. After two years of elaborate research work, the standing committee presented for the aproval of the conference standards covering axles, wheels and tires, grooved rails, trolley wires and rubber hose. Specifications were also presented for car springs, lamps, trolley and span wires, brushes and paving materials, white metal, and aluminum bows. Other parts of equipment were also considered. Standards for traction motors were discussed, and the question was raised as to whether standardization will be taken up with the International Tramway Association.

American Association News

Power Generation and Conversion

A MEETING of the committee on power generation and conversion was held at association headquarters, New York, N. Y., on March 13. Those present were: L. D. Bale, chairman; C. E. Bennett, H. W. Codding, H. E. Davis, F. W. Peters, R. L. Weber and G. I. Wright. Mr. Dixon represented C. A. Butcher and Mr. Mueller represented G. W. Saathoff.

An outline of the progress made by the National Electric Light Association on the subject of specifications for the purchase of fuel was given. The revision of these specifications has been a subject of investigation by a subcommittee of the prime movers committee of the N. E. L. A., and a tentative specification was submitted in 1923. Additional comments were included in the 1924 report. The committee on power generation and conversion considered it unnecessary to duplicate the work of the N. E. L. A., but a review of the subject will enable the committee to submit desired revisions.

Substations were divided into three proposed groups, full automatic, semi-automatic, and partially attended stations. Considerable difficulty was experienced in differentiating between substations to be classed in the second and third groups. The committee decided to define rather definitely automatic substations, in so far as these plants can properly be classified as fully automatic and semi-automatic substations. In regard to the third classification, the committee decided that where the results obtained by the functioning of the control schemes were not sufficient to justify a station being termed as semi-automatic, that the term automatic would be applied incorrectly, and therefore should not be used in describing this type of plant.

A full automatic substation was defined as a plant in which the control installed will give maximum protection to service and equipment and where all the functions of operation are performed without the aid of an attendant. A semi-automatic station is one in which the control installed will give partial protection to service and maximum protection to equipment. The act of placing this class of plant in operation after it has been discontinued either by reason of normal or abnormal operation must be accomplished manually.

The final report of the committee will contain a tabulation of various automatic devices, which are included in the functioning of equipment operating in the two classifications of substations.

An outline of the principal scheme of direct-current automatic feeder control was presented. This covered three combinations, not including the well-known resistor type. The committee decided to include in the report a discussion of the adaptability of the various control schemes offered with a view of determining the limitations of each.

A very comprehensive procedure for conducting tests of ventilation and investigation as to noise reduction in operation of automatic substations was presented.

In regard to the subject of high tensile strength bolts for use of superheated steam line pipes, it was brought out that the American Society for Testing Materials is preparing specifications on this subject, which are also being considered by the National Electric Light Association. In view of this, it appears unnecessary for the committee on power generation and conversion to take action at the present time.

Accident Prevention Posters Ready

FOLLOWING the recent national conference on highway safety which was held at Washington the American Electric Railway Association pledged itself to display certain accident prevention posters in its cars during the coming year. Subsequently, the committee on publicity caused the first of these posters to be prepared. Samples of them are being sent out now. Other posters will be worked out in co-operation with the representatives of the conference at various times during the year.

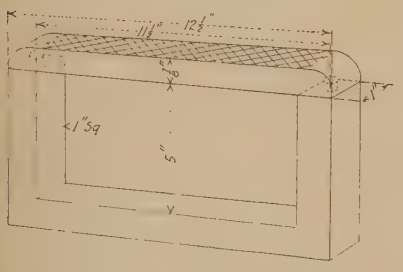
No charge will be made for these posters when ordered in reasonable quantities. By this is meant a sufficient quantity to cover the cars on a single system or the bulletin boards of a plant. Should an organization plan a city-wide campaign that would require the use of hundreds of posters, some charge might be found necessary.

The Advertising Section is receiving orders for the posters.

Maintenance of Equipment

Grinding Triple Valve Seats

A SIMPLE device for grinding triple valve seats has been installed in the Naval Academy Junction Shops of the Washington, Baltimore & Annapolis Electric Railroad. This company operates high-speed multiple-unit interurban trains between Baltimore, Annapolis, Washington and intermediate points. To prevent air blowing past the triple valve ports it is necessary that the surfaces of the piston and the valve seat be smooth and in close contact. As the piston can be removed easily it is a simple matter to grind down any high spots on its contact surface.



This Jig Is Used by the Washington, Baltimore & Annapolis Electric Railway for Grinding Down Triple Valves

The valve seat, on the contrary, is rather inaccessible for grinding. To accomplish this a jig has been built in the shape of a hollow square as shown in the accompanying illustration. A piece of 1-in. square steel has been bent to form three sides of the square. Across the fourth side is a piece of 1-in. x ⅜-in. cast iron with 3/32-in. serrations on its upper surface. The dimensions of the cross-piece are arranged to correspond with the interior dimensions of the valve. This piece is held by dowel pins extending from the ends of the larger member.

A vise holds the bottom of the U-shaped piece in a vertical position. The top bar is placed inside the triple valve casting as shown in the accompanying illustration. Grade FF carborundum is applied to the serrated cast iron surface and by moving the valve back and forth the seat is ground smooth.

By means of this apparatus it has been possible to restore triple valves to good condition in a comparatively short time. The average is about two hours for taking the valve apart, grinding smooth the piston and the valve seat, and reassembling the parts. Previously it was necessary to send the valves back to the manufacturer for repairs.

Triple Valve Casting in Position on a Jig Designed to Grind Down the Valve Seat

Spraying Varnish Inside Motor Frames

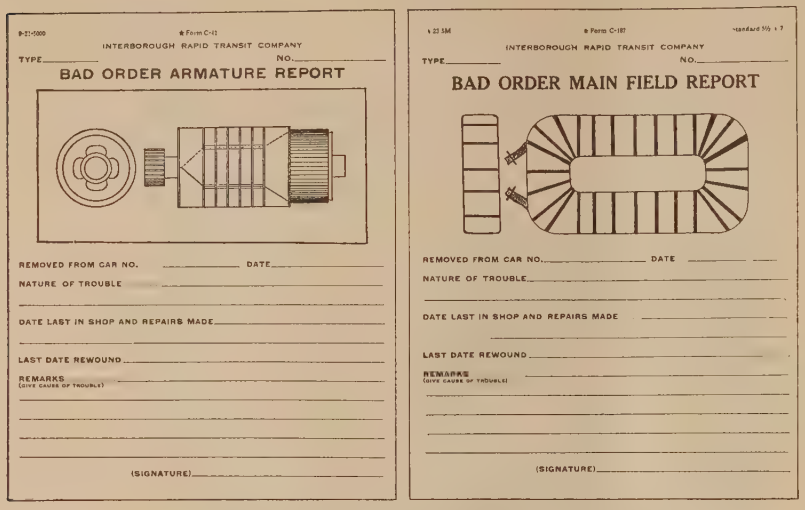
THE practice of coating the inside of motor frames with Sterling varnish after the field coils have been assembled is employed in the shops of the Department of Street Railways for the City of Detroit, Mich. The varnish is applied with a home-made spraying gun which has two flexible connections, one for the air supply and the other for the Sterling varnish. Convenient valves in the two lines provide for ready adjustment by the operator. The varnish is sprayed in around the field coils, and also covers places of the frame which are liable to cause short circuits or grounding from flashovers. An accompanying illustration shows a motor frame being coated with the varnish.

"Bad Order" Cards

THE blanks used in the repair shops of the Interborough Rapid Transit Company for "bad order" field coils and armature coils are reproduced in the accompanying engravings. These cards were mentioned in the article on the Interborough shops on pages 440 to 449 in last week's issue. These cards are 5½ in. x 7 in. The field coil card is printed on white stock, the interpole field card on blue stock and the armature card on buff stock.

The feature of these cards is the

Spraying Varnish Inside Motor Frame in the Shops of the Detroit Municipal Railway


INTERBOROUGH RAPID TRANSIT COMPANY
TYPE NO.
BAD ORDER ARMATURE REPORT
REMOVED FROM CAR NO. DATE
NATURE OF TROUBLE
DATE LAST IN SHOP AND REPAIRS MADE
LAST DATE REWOUND
REMARKS (GIVE CAUSE OF TROUBLE)
(SIGNATURE)

INTERBOROUGH RAPID TRANSIT COMPANY
TYPE NO.
BAD ORDER MAIN FIELD REPORT
REMOVED FROM CAR NO. DATE
NATURE OF TROUBLE
DATE LAST IN SHOP AND REPAIRS MADE
LAST DATE REWOUND
REMARKS (GIVE CAUSE OF TROUBLE)
(SIGNATURE)

Bad Order Cards at Interborough Shops

use of a cut on which the defects in the coil may be marked. The backs of these cards contain space for further remarks and also a duplicate of the cut.

Improved Motor Suspension

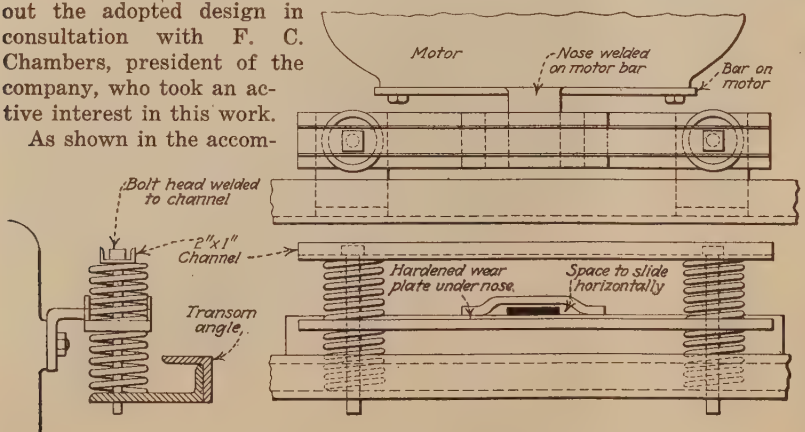
AN IMPROVED type of motor suspension has been developed by the Des Moines City Railway and is being installed on Brill 77-E-1 trucks in use on that property. The object has been to make the suspension more flexible to relieve the shock on the entire equipment. At the same time the design employed permits a certain amount of lateral motion at the suspension nose, so as to avoid binding and breakage of axle bearings.

Improvement in the customary type of suspension was considered an important and necessary step. C. R. McMahon, master mechanic, worked out the adopted design in consultation with F. C. Chambers, president of the company, who took an active interest in this work.

As shown in the accompanying drawing, a short flat nose is welded to the suspension bar bolted to the motor. This nose is supported between the two sets of suspension springs, on a flat bar. It can be seen from the design that the nose is thus permitted a certain amount of lateral motion.

Across the tops of the suspension springs, a 2-in. x 1-in. channel is carried. The bolts passing down through the springs are welded to this channel. This helps to hold the springs in a vertical position under the action of any side stress. The bottoms of the springs are supported on short pieces of angle fastened to the lower face of the transom angle to lower the point of support so as to permit the use of a longer spring.

Results from the use of this type of spring motor suspension show that the resilient construction relieves the motors of many shocks and hammer blows and reduces motor failures.



By Supporting the Motor on a Suspension Arranged to Permit a Certain Amount of Lateral Motion Axle Bearings Are Relieved of Binding and Excessive Wear and Breakage Are Avoided

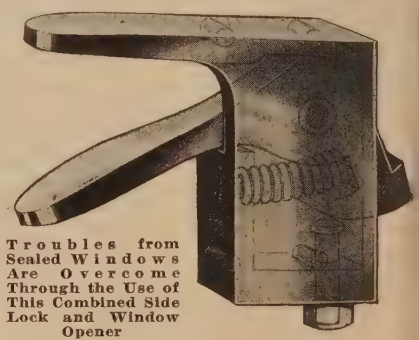
New Equipment Available

Buffing and Polishing Machine

AN EXTRA heavy-duty double spindle and a heavy-duty single spindle buffing and polishing machine have recently been placed on the market by the Cleveland Armature Works, Cleveland, Ohio. Both of these machines are chain-driven by alternating-current motors, designed for the particular service, set close to the spindles. The double-spindle unit is provided with two motors, each spindle being entirely independent mechanically and electrically. Both machines are equipped with Timken tapered adjustable roller bearings. Control is through an oil circuit breaker and push-button.

Window Opener Combined with Sash Lock

TO MEET the demand for a device which will assist in starting windows after they have been left shut for some time, the National Lock Washer Company, Newark, N. J., is placing a combined sash lock and window opener on the market. This device acts as a sash lock on a rack in a manner similar to other types manufactured by the company. In addition, a pin extends through the



Troubles from Sealed Windows Are Overcome Through the Use of This Combined Side Lock and Window Opener

bottom of the lock case which, when the window is closed, rests on a plate on the window sill or a section of the rack turned at right angles. Pressure exerted against the lower finger piece of the lock is multiplied many times and transmits a downward thrust to the pin against the sill. This is sufficient to start the sash. When started, it usually can be raised quite readily. The lock is secured to the sash frame by four dowel pins and a through screw.

The News of the Industry

Railways Not Hard Hit

Small Damage to Electric Systems in Storm-Swept Zone—Distribution Plants Suffer

Despite the terrible loss of life and property in the tornado-stricken districts of southern Illinois and western Indiana, reports from the utilities operating in these territories indicate relatively small damage to electric railway properties. Many representatives of utility companies attending the convention of the Illinois Utilities Association in Chicago left hurriedly to return to their stations in the stricken districts. Of the towns which suffered the worst casualties, West Frankfort and De Soto, Ill., and Griffin and Princeton, Ind., are served by the Central Illinois Public Service Company, controlled by the Middle West Utilities Company; Murphysboro, Ill., by the Western United Corporation, and Duquoin, Ill., by the Illinois Power & Light Corporation. Other towns in which casualties were heavy in proportion to the population are served by municipal plants from which no reports have yet been received.

Everywhere in the devastated towns the electric light and power companies showed their public spirit by prompt restoration of service and the extension of help of every kind within their power. In West Frankfort, for instance, where it will take a month to restore gas service, electric lights were burning two days after the disaster.

A typical example of the effects of the storm is contained in the experience at Princeton, Ind., with more than seven thousand inhabitants. The tornado devastated the southern half of this town, completely wrecking a portion of the Consumers Power Company's 33,000-volt double-circuit transmission line and its distribution system. The Southern Indiana Gas & Electric Company's 33,000-volt transmission line supplying that company's interurban railway into Princeton was completely wrecked for more than a mile, and it will probably be several weeks before the traction line is again in operation between that point and Evansville, Ind.

Will Appeal to Governor on International Railway Rate Case

Frank C. Perkins, the Socialist member of the City Council of Buffalo, N. Y., has demanded that the International Railway be required to post a bond for $500,000 and give rebate slips to car riders in case the 8-cent fare decision of the Public Service Commission is not sustained. An appeal from the higher fare allowed by the state utilities board will be taken by the City Council.

The City Council also will ask Governor Smith to review the rate case with the idea that if the Public Service Commission has been found negligent, the Governor could be asked to recommend the removal of the commissioners from office.

When the City Council informed William R. Pooley, member of the state utilities board, of the ultimatum that the railway would undertake no track reconstruction or repaving because of lack of funds, Commissioner Pooley replied that the city has authority to compel the railway to put its tracks in such condition that the city can carry out its 1925 street paving program.

William F. Schwartz, commissioner in charge of this phase of municipal work, has informed the City Council and members of the Public Service Commission that the ultimatum of President Tulley of the International is delaying the repaving and improvement of more than 30 miles of streets in Buffalo.

$700,000,000 Transit Program

City of New York Proposes Staggering Expenditure for System to Be Municipally Operated—Thirty-nine Miles of Rapid Transit Construction Proposed

THE Board of Transportation of New York City on March 20 adopted additional subway routes in Manhattan, Brooklyn and the Bronx, aggregating 22.90 miles, the construction cost of which, not including track laying, station finish nor equipment, is estimated at $186,046,000.

The routes announced are to become important parts of Mayor Hylan's projected independently owned and operated system of rapid transit. They are additions to the city administration's independent subway building program as announced by Mr. Delaney last December. The figure quoted includes the boring of tunnels under the East and Harlem Rivers and Newtown Creek, but not that of the Staten Island tube nor its approaches and connections.

In the Board of Transportation's report it is estimated that construction of each mile of the new routes just adopted will involve an average expenditure of about $8,862,282.

Mere construction costs of the subways on routes adopted on March 20, together with the costs of the portions of the system approved on Dec. 9 last, have reached a total of $345,629,000.

A recapitulation of the estimated cost of the entire proposed comprehensive rapid transit development sponsored by the Mayor and as recently calculated by an administration spokesman, including actual construction, tracks, yards, equipment and station finish, indicates a grand total approaching $700,000,000.

The 22.90 miles of routes adopted on March 20 plus the 16.82 miles of routes approved last December bring the total accepted routage of the Hylan system up to 39.72 miles. Including double and quadruple track lines, the accepted track mileage amounts to 118.60.

The board's estimated cost of each route, together with the route and track mileage, is shown in the accompanying table.

These figures do not include shops, yards or equipment. The report points out that the most costly items in the estimates' expenditures are the tunnels, three of which will be under the East River, one under the Harlem River, one under Newtown Creek and another under the Gowanus Canal.

In his report to the Board of Estimate and Apportionment Chairman Delaney said:

> The Brooklyn crosstown line will be two tracks: the Culver line extension will be four tracks as far as the Jay Street tunnel; then two tracks under the river to Rutgers, Essex and Houston Streets.
>
> The Bronx Concourse line will be three tracks in Manhattan and under the Harlem River, and four tracks in the Bronx. The Fort Washington Avenue-Broadway-216th Street extension will be two tracks.
>
> It is anticipated that detail drawings of the Brooklyn crosstown line will be ready for contract bids before summer.
>
> The routes adopted and estimates of cost will be forwarded to the Board of Estimate and Apportionment as soon as completed.
>
> The engineers of the board are nearing completion of their studies for the Queens extension from the Union Station at Nott and Jackson Avenues, Long Island City, to Jamaica.

Although the bare construction of the routes, so far as they have been adopted, is only $345,629,000, the final total cost will far exceed that sum. In the course of the inquiry before Justice John V. McAvoy experts testified that it would require a sum equal to about one-half of the mere construction cost to lay the tracks, finish the stations and provide rolling stock and other equipment. This would put the additional cost of the independent municipal system, as now proposed, at about $175,000,000, and this, in itself, would bring the grand total up to $520,000,000 for the routes covered only in the Board of Transportation reports of last December and of March 20.

Route	Estimated Cost	Route-Miles	Track Miles
Brooklyn crosstown.....	$64,884,000	9.24	19.18
Culver line extension.....	60,000,000	5.77	22.44
Bronx-Concourse.....	38,681,000	4.85	12.20
Houston-Essex and Rutgers Streets.....	17,337,000	2.08	6.26
193d-216th Streets.....	5,144,000	0.96	1.92
Total.....	$186,046,000	22.90	62.00

The Interborough Rapid Transit Company, New York, will appeal for protection to the courts if ordered to extend the local subway platforms as recommended in the McAvoy report. The company estimates the cost of the entire work at $28,000,000 and says that it has not the money to pay its share, under its contract with the city. This subject was considered again at a hearing before the Transit Commission on March 23, when the company presented detailed estimates of the cost of extending these platforms, of other obligations under its contract and of its probable earnings and expenses during the coming year. At the close of this testimony, the meeting was adjourned to allow representatives of city and commission to examine the figures and later cross-question the company representatives.

Chairman McAneny presided. He declared that there was no question that the company must carry out its contract obligations, but there was always a question whether any order issued to it was just and reasonable, and the company had a right to appeal to the courts in any particular case for the meaning of the words "just and reasonable." He also thought the financial condition of the company should be considered in determining what was just and reasonable. For that reason the testimony presented at the hearing was pertinent to the question.

During the early part of this week, the Interborough securities were subject to heavy pressure on the New York Stock Exchange. On Monday I. R. T. stock sold at 13⅛ as compared with a high of 34½ during 1925, and the 5 per cent refunding bonds sold at 59⅛ compared with a 1925 high of 74½. The drop in Manhattan Elevated stock was even greater. The guaranteed stock fell to 65 from the 1925 high of 100 and the modified guaranteed stock to 32⅜ from a 1925 high of 51¼. Owners of the guaranteed stock did not accept the suggested reduced guarantee in 1922, whereas the holders of the modified guaranteed stock did accept the modified guarantee. Mr. Quackenbush, general attorney for the company, declared on March 22 that there would be no receivership for the company pending judicial determination of the company's obligation to lengthen the local subway platforms.

Fate of Missouri Bus Bill in Balance

The McCawley measure, designed to provide for state control over buses operated in Missouri, has passed the Senate, but is in for a sharp fight in the House. Opinions concerning the probability of its passage are divided, but Senator McCawley has already prepared a "short bill," which he will try to rush through if the full measure fails. The "short bill" merely provides that buses shall be declared common carriers under the terms of the act creating the Public Service Commission.

The governing idea behind the original bill was to give the State Public Service Commission exclusive regulatory authority. A certificate of convenience and necessity would not give an exclusive right to a route and the commission could grant a certificate to a railway to operate buses over a route on which buses were already operated.

Philadelphia Rapid Transit Explains

Sees "Power in Coils of the Octopus" —Resents Recent Malingering of Mitten Management

Service Talks, published by the Philadelphia Rapid Transit Company, Philadelphia, Pa., says Drexel & Company have found in the Philadelphia Electric Company a choice morsel through the hold of the bankers on an option on the Conowingo power development, through which it is proposed to harness the waters of the Susquehanna for the manufacture of electricity. According to *Service Talks*, it is now planned that Philadelphia Electric surplus shall be so used up in the Conowingo project that millions of dollars will go to the bankers by way of profits and commissions. Says that paper:

P. R. T. was in desperate straits in 1910. The attorneys for the management, fearing the effect of bankruptcy, prevailed upon Mr. Stotesbury, through the pretext of a stockholder's petition, to assume financial responsibility for the property. Mitten Management came to Philadelphia in 1911 at Mr. Stotesbury's request and after examining the property and seeing its possibilities, promised, if given absolute authority in all things, to rehabilitate the property and make it a credit alike to the community, the employees and the company. Mitten Management has now succeeded, but for the first ten years the bankers' domination stood in the way of the complete achievement possible of attainment for public, employees and owners.

As the building up of the property proceeded, the strangling influence of the banker group increased in proportion. The last straw came in 1920, when the Stotesbury interests forced the increased fare—against the protest of Mitten Management—in order to advance their selfish ambitions in other cities where increased fares were made difficult of attainment because of our success here with the 5-cent fare. After a long struggle, the bankers succeeded in increasing the fare, but their despicable tactics so strengthened the hand of men and management that they finally fought free from their demoralizing influence. The bankers' only interest in P. R. T. improvement was obviously to use the stabilized property to advance their own interests, instead of for the legitimate owners and employees of the company, and for the car riders. The 1920 increased fare lost P. R. T. 100,000,000 short riders, which forced the fare increase of 1924.

Service Talks says that "Mitten Management's record since 1920, when the coils of the financial octopus were thrown off, is the best evidence of what the future may hold for the owners of public utilities—honestly administered."

In discussing the question of Mitten Management *Service Talks* says in part:

Mitten Management will cost P. R. T. for 1925 an estimated $250,000—one-half of 1 per cent of gross earnings, and $100,000, representing 3 per cent of all construction expenditures, a total of approximately $350,000. These fees are for operating P. R. T. property and supervising new construction, and are used to pay the salaries and expenses of those supervising the management, some of whom have been trained in the Mitten organization, while others have been chosen for unusual skill in some branch of public utility management.

The capitalistic press endeavor to create the impression that this fee is a personal salary paid to T. E. Mitten. It is no more a salary than the 4½ per cent of gross earnings paid by the Bell Telephone Company to the American Telephone & Telegraph Company for similar services, or the 3 per cent of gross earnings which it has been proposed should be paid in the hope of securing similarly efficient operation of New York's new subways.

Mitten Management has given to P. R. T., without royalties or other charges for patent rights, all of its inventions, which include the most important improvements made in street car equipment during the past fifteen years. These embrace the near-side car, the center-exit car and the one-man car, with their many safety devices, which have been almost universally adopted elsewhere. Mitten Management's gas-electric motor bus, which bids fair to revolutionize the bus industry, comes to P. R. T. free of any cost for patents.

If Philadelphia wants the best transit system in the world, it can only get it by having the best men in the world to manage and operate it. Whatever agency gives this service surely deserves to share in the benefits—at least to the extent of its expenses—and to be in a position to pay the men who make its success possible.

In *Service Talks* distributed on March 26 the Philadelphia Rapid Transit Company indicated that it is endeavoring to obtain control of the Philadelphia Electric Company as a result of the controversy over the Conowingo power project. The statement says the "P. R. T. management's sole interest in P. E. lies in preventing the uneconomic Conowingo project being imposed upon P. E. stockholders, P. E. customers and P. R. T. car riders for bankers' profit."

Attempt to Amend Grant May Delay Kansas City Franchise

The bus franchise under negotiation for several months in Kansas City, Mo., to give the Kansas City Railways exclusive right to operate auxiliary buses on the city's streets has experienced at least two additional setbacks recently.

A bill agreed to by the Council committee in all its outstanding points was introduced into the City Council on March 16. It was expected the measure would pass the house at once and become a bona fide ordinance as soon as put through the regular Council channels.

Contrary to its presumed acceptability previous to the time of introduction for passage of the bill, an amendment was at once proposed by one of the city Aldermen to make the franchise effective only from the date the ordinance is passed and approved until six months after the receivership. As the present receivership is expected to be lifted about Dec. 31, 1925, the franchise, if approved, would probably become ineffective in a little more than a year.

The receivers doubt that the franchise as amended would be accepted with the sanction of Judge Kimbrough Stone, referee. They believe the court will not favor any plan for an investment such as is entailed in purchasing 63 buses, if the bus franchise is to run for a period less than three years. This would probably mean that the railway may not be at liberty to purchase the buses necessary to start.

Matters may, however, be changed by state legislation. The McCawley bill will, if passed, place the control of bus lines within the state in the hands of the Public Service Commission and would automatically render null and void any objections which officials of any city in Missouri may raise in regard to bus services.

Decision Against Atlanta Jitneys Favors Railway

The battle of the Georgia Railway & Power Company, Atlanta, Ga., against unregulated jitney competition appears to have been won on March 19, when Judge George L. Bell of the Fulton Superior Court denied a petition on the part of the Atlanta Jitney Bus Association to set aside as unconstitutional the anti-jitney ordinance passed on Feb. 8 by the City Council of Atlanta.

Judge Bell ruled that the anti-jitney law was constitutional. He said he would sign a formal order dissolving the temporary injunction secured on March 8 by the jitney bus association to prevent the city from enforcing its ordinance.

The court also declined to grant a writ of supersedeas for cars of less than 17 passengers. This automatically withdraws all five and seven-passenger machines from the streets of Atlanta as soon as the order is signed.

Although the Atlanta Jitney Bus Association is planning to carry the matter to a higher court, the points of law are brought out so clearly in Judge Bell's decision as to make this seem almost a futile procedure. Moreover, many bus operators, apparently realizing the hopelessness of their case, have already abandoned their buses and have secured employment elsewhere. These men will not return to work, and it appears very unlikely that new jitney operators can be found to carry on under the present legal status of the jitney in Atlanta.

The regulatory measure at Atlanta has been referred to frequently in the ELECTRIC RAILWAY JOURNAL since the matter became acute recently. Stated very briefly, the new law provides that all jitneys be prohibited from operating on any streets where there are car lines, on streets within two blocks of and parallel to streets occupied by car lines, and on streets in the downtown district of the city in what is known as the congested area.

Denver Tramway Organizes Bus Subsidiary

Realizing the necessity of transportation lines in various parts of the city not served by the street cars the Denver Tramways, Denver, Col., has organized the Bus Transportation Company and has asked Mayor Stapleton to place upon the ballots in the May 19 election a plea that the company be given a franchise. The buses will run on regular schedule with a 10-cent fare and transfers will be issued from one bus to another. Whether or not the transfer will be good on the railway line is not yet decided. The initial equipment will be ten modern buses.

Receiver Stenger of the tramway said that if the voters acted favorably upon the franchise the company would have an opportunity to plan extensions in the future, and that if the franchise was granted the first buses would be put in operation within four or five months after election. On the question of the installation Mr. Stenger said:

The last few years have witnessed great changes in city transportation in the combination of the gasoline engine with the old type of buses. A motor bus has been produced, and while it has not yet been developed to a point of perfection, nor to a point where it can be called standard, it has convinced many people that there is a necessity for it in connection with regular railway service.

Because there seems to be some sentiment in favor of buses and with a view to meeting changing conditions, it is the intention of the Bus Transportation Company to give them a trial in Denver.

New Ordinance Introduced

Councilman Rose's Plan for Cincinnati Street Railway Provides for Initial 7½-Cent Fare

A new franchise ordinance, based upon a capitalization of $25,000,000 for the Cincinnati Street Railway, Cincinnati, Ohio, and providing for regulation of operation by the city rather than for entire control, has been introduced in the City Council by Charles O. Rose, Councilman. Mr. Rose explained that he drew the ordinance chiefly in the hope that the provisions contained might serve as a basis for settling the present deadlock over the question of passing a 25-year 7½-cent fare contract.

The ordinance would allow the Street Railroad Director to make his own decision regarding submitting any of his orders to arbitration, while the pending ordinance makes arbitration compulsory. It provides that the fare at the start would be fixed at 7½ cents for two years by Council, with provisions for revision according to the earnings of the company at the end of that period. Mr. Rose also would allow revision of the entire ordinance every five years. The fare, when low, would allow a higher percentage of return to the company than when high, thus making an incentive for the company to bring the fare down.

While the pending ordinance provides 6 per cent return on capital stock and requires that 1 per cent may be used for fare control until Jan. 1, 1928, the new ordinance sticks strictly to a return on the investment and bases the rate of return according to the rate of fare, as follows:

Fare, Cents	Return
7	6½ per cent
6½	6⅝ per cent
7½	6¼ per cent
8	6 per cent
8½	5⅞ per cent
9	5½ per cent
9½	5¼ per cent
10	5 per cent

The pending ordinance fixes the initial rate at 7½ cents, subject to change every three months, based on the theory of service at cost. The new ordinance provides that Council fix the fare for one period of two years at a flat rate. The initial rate is 7½ cents; the revision of fare taking place every two years is not based entirely on cost at the time of revision, but on the expenses of the company. Special provision is made for a revision of fares before two years in case of emergency.

The brief filed with the new ordinance mentions four subjects that require special treatment — the Cincinnati & Hamilton Traction Company, bus competition, rapid transit loop and new passenger depot. It suggests surveys on each of these subjects.

Many Changes Recommended for Oklahoma Railway

George H. Clifford of Fort Worth, who has made a survey of the Oklahoma Railway, Oklahoma City, Okla., for Stone & Webster, Inc., has recommended drastic changes in operation. He would abandon the use of the terminal station in the business center and operate cars through the down town section instead of over the terminal station loop. He also recommends increased service and an aggressive selling campaign to induce the public to use the cars. He finds that automobile "pick-ups" cost the company $50,000 a year. He also recommends purchase of several new cars and reconstruction of many now in use. Co-operation of city and state authorities to prevent cut-throat bus competition is held essential.

The improvements recommended to be carried out would cost $202,500. The report says that the facilities of the company are adequate to handle service at present, and the changes suggested are recommended for convenience and economy, and in the interest of efficient operation.

Full co-operation of patrons of the railway, as well as that part of the public owning private automobiles, and city officials is the one essential to place the railway in a position to give adequate service. When the railway is rebuilt there will be no further need for the South Robinson jitneys.

Improvements in equipment include the purchase of fifteen new cars at a cost of $112,500; equipping ten of the present safety cars for both single and double-end operation, at a cost of $44,200; equipping cars with power-saving devices, to reduce operating cost, at a cost of $6,100.

Parking rules should be amended to provide that automobiles moving into and out of parking spaces can do so without blocking traffic. Mr. Clifford said:

Our study shows that it requires seven times more space to a person to move people in Oklahoma City by private cars than by street cars, and that in addition to automobiles moving in the streets, the parking space used by them is from 25 to 40 per cent of the total street space.

Increasing the average speed of cars from 8.7 miles to 9.8 miles an hour also can be accomplished under the proposed recommendations.

The report indicates that operation of buses as an adjunct to the railway probably will not be needed for some time, but as the city develops, it probably will be found necessary to operate buses as a supplement to electric service, for cross-town or suburban service.

A bill is pending in the State Senate which, if adopted, will authorize electric railways to operate buses in connection with city and interurban car service. George A Henshaw, receiver for the Oklahoma Railway Company, plans to establish bus lines as feeders to the interurban system at Guthrie, El Reno and Norman, if the bill passes, and also, if permitted by the State Corporation Commission, to abandon certain non-paying lines in Oklahoma City and provide bus transportation in lieu thereof.

Iowa Interurban Organizes Bus Company

The Fort Dodge, Des Moines & Southern Railroad, operating an interurban system through Boone, Iowa, will organize a bus line with $50,000 capital as the Fort Dodge, Des Moines & Southern Transportation Company, with officials of the interurban line as incorporators. The new company will establish and operate bus transportation through the same territory served by the electric lines. C. H. Crooks, president of the interurban, announcing the new corporation, said that the growing use of the automobile as a means of transportation was rapidly changing the desires of the public as to service requirements. Recognizing this fact and believing that it was the company's duty to serve the community it had determined to enter the bus business. He stated further that the bus service to be installed between the points now served by his road would be in addition to the electric service provided, and that operation of the buses would be in the hands of experienced transportation officials. The organizers of the new corporation are: C. H. Crooks, F. M. Johnston, C. M. Kelly, F. M. Steele and W. R. Dyer.

Electrification Measure Passed in Ohio

The Norfolk & Western Railway and the Van Sweringen railroad interests are said to be greatly interested in a bill passed by the Ohio State Legislature that provides methods whereby they can electrify their railroad properties. The bill gives the Public Service Commission power to make regulations for electrification of steam roads. The measure is required by the Van Sweringen interests to aid them in carrying out their plans for a new central terminal station in Cleveland. Under the franchise, roads entering the terminal must be electrified within five years after the new station is ready for use. The Norfolk & Western is understood to be considering the use of electricity on its lines within the state during the next few years.

Bus Proposal for Palo Alto Outlined

The Peninsular Railway, San José, Cal., has submitted to the City Council its plan for the substitution of buses on certain lines in Palo Alto proposed to be abandoned. Buses would be run on the same headway now used by the street cars over the route from the Southern Pacific Station or the Circle. The fare between Stanford University and the Southern Pacific station, Palo Alto, on the street cars will be the same as at present, namely, 6 cents for the one-way trip. The fare on buses will be 10 cents, passengers to be allowed to transfer free from bus to street car, but to pay 4 cents to transfer from street car to bus. The franchise for buses is to be limited to Aug. 15, 1953, the expiration date of the present franchise. If after operation for a year the revenue derived from the buses is not sufficient to pay operating expenses, depreciation, taxes and 6 per cent on the investment, it would be left to the company to decide whether the service would be abandoned. City lines in Palo Alto have been able to pay only operating expenses for several years. The city intended to improve streets in connection with paving. This would demand a reconstruction cost to the company of about $230,000. Conferences between the company and the City Council of Palo Alto followed, with the result that the company petitioned for abandonment of city lines north or east of the Southern Pacific Railway's tracks.

Some Recent Newspaper Comments

"Exit the Trolley—Enter the Motor Bus." This is the title of an editorial in a recent issue of the Detroit *Free Press* in which the statement is made: "That the trolley car as a means of transportation is already out of date is perfectly obvious." Likewise the *Free Press* says that further building of trolleys in Detroit will prove a mistake and a waste. It is "convinced that if the main arteries . . . could be cleared of their tracks, and an adequate number of motor buses substituted for the present trolley cars, the public would be more satisfactorily served." The *Free Press* was fearful about the city's purchase of the local railway from the very outset. It "warned the voters that they were purchasing a system of transportation that was fast becoming obsolete."

But these are not expressions of opinion that are isolated. Similar prattle in the daily press is encountered at almost every turn. Says a paper down in Georgia (identity unknown): "We may be called foolish for writing it but the street car—the old, clumsy, costly, noisy, weighty blunderbuss of the present day—is headed for the junk heap." In a reference to the jitney situation in Atlanta it warns the "arrogant street railway officials" to remember. On the other hand, the Toronto *Globe* says that "the day of the trolley may have gone in Detroit, but the present system will likely remain in Toronto for some years at least." But the *Globe* appears to be not altogether sure of itself, for in another place it says that "the future of the trolley car, of course, presents a grave problem for Toronto." It sees the Toronto Transportation Commission "not entirely wedded to the trolley car," despite the vast expenditures made in recent months on the railway.

As the Greenboro *Record* sees it "there is no argument against the bus." It sees an economic warfare being waged the country over between vehicles that run on rubber and those that run on rails, and it looks upon the matter as having "developed some interesting situations." However, that paper inclines to the belief that "the time is not yet come when the street cars have outlived their usefulness." Even the New York *Evening Sun*, in its issue of March 26, referred to the "present old-fashioned street railway car."

These quotations, taken at random from recent newspapers, are fairly representative of much of the comment current at the present time.

Merchants Lease Lebanon Lines for Day

Every one in the city of Lebanon, Pa., and surrounding territory rode free on the street cars on March 11. That day, from 8 a.m. to 5 p.m., the entire railway system of the Reading Transit Company, in Lebanon, was leased to the retail merchants and free transportation was provided as a means of getting more people to attend a special "Prosperity Day" sale in the stores.

The plan was suggested by officials of the Reading Transit Company to the merchants with the claim that it would increase sales. More people rode the cars than on any previous occasion in the history of the Lebanon division of the system, and the merchants had bigger total sales than were ever recorded for a single day's business.

Normal daily receipts of the railway increased about 50 per cent. Merchants leased the lines for a sum representing the average full day's receipts. The extra money received by the railway came from patrons who rode the cars prior to and following the hours during which the lease was effective. Fares were also collected from people who rode between zones on the suburban routes, the free service being restricted to those who traveled the entire distance into the city from points outside of Lebanon.

Aside from the increased revenues of the day the railway received a tremendous amount of favorable publicity in Lebanon and the surrounding towns. The company, in its own advertising, called attention to the free service, and in addition every merchant in his advertising for the "Prosperity Day" sale urged patrons to "ride the street cars." Posters were used on the street cars for several days prior to "Prosperity Day" to remind people to "Ride Free Wednesday and Shop in Lebanon."

$20,000 in Prizes Offered

Prizes aggregating $10,000 have been offered by Bonbright & Company, Inc., New York, for the best contemporary review and forecast of the electric light and power industry, to be written in the form of an article summarizing the progress of the decade 1920-1930, and dated as of Jan. 1, 1930. It will thus be, in effect, a five years' review and a five years' forecast.

The article should comprehend the development of the industry in all its phases. It should treat not only of engineering accomplishments, but include also matters affecting public relations, finance, markets, transmission and distribution of electricity, its utilization and its effect on the industrial and social structure of the nation.

Bonbright & Company, Inc., are conducting this competition in the hope and belief that such constructive analysis will prove of real value to the industry. The donors have prepared a "Data Book" of the most generally accepted statistics on the industry at present, a copy of which will be forwarded without charge to any contestant.

The American Superpower Corporation is offering a supplementary award of $10,000. The competition is open to all.

Hylan Transit Bills Killed

Mayor Hylan's transit bills were defeated in the New York Senate on the night of March 26 by a party vote of 28 to 21.

The Legislature took a step toward carrying out the recommendations of the McAvoy report, however, when the Assembly passed the Nicoll bill taking away from the Transit Commission the power it now has to alter contracts entered into by the city administration. Its passage by the Senate is forecast.

The three bills defeated had the approval of Governor Smith. They provided for the exemption of $275,000,000 in transit bonds from the city's constitutional debt limit, the abolition of the Transit Commission and for permission to the city to own and operate a municipal bus system.

News Notes

Wants to Substitute Buses. — The Seattle & Rainier Valley Railway, through its general manager, Walter N. Brown, has applied to the Department of Public Works at Olympia, Wash., for permission to replace street cars with buses on its Seattle-Renton line. The company will use the equipment taken off the Renton line to improve its service on the line within the city. The rails to Renton will be left for freight carriers and for emergency passenger service. Rail passenger service will be maintained to Rainier Beach. The buses, the application states, will make the entire round trip between Seattle's downtown section and Renton over the same route now covered by the cars and presumably on the same half-hour schedule. The bus rate will be 20 cents between Seattle downtown and Renton and 15 cents between Bryn Mawr and Seattle. The distance between Seattle city limits and Renton is about 4 miles and the entire run from downtown 12.59 miles.

Buses Will Succeed One-Man Cars.— Buses soon will supplant one-man trolleys on the streets of the city of Geneva, N. Y., and will replace interurban cars on the Geneva-Waterloo-Seneca Falls line, according to plans announced by C. D. Skuse, superintendent of the Geneva, Seneca Falls & Auburn Railroad. Formal application will be made to the Public Service Commission for permission to abandon the trolley lines and operate two or more buses instead. The move is said to be a popular one as the buses will reach districts not now accessible to the trolley lines, notably factory and park districts. The company expects to operate 29-passenger buses. This road parallels the present trolley route.

Relief from Paving Charges Granted. —On March 12, 1925, the Governor of Montana signed a bill intended to relieve the electric railways of the State from all charges for paving except where the damage to the pavement is caused by the presence of the tracks in the highway or by the carrying out of repairs to the tracks.

Retains Attorney for Appeal.—The city of Denver, Col., declares that it has retained Harvey Riddell as special attorney to prepare its appeal from the decision of Judge Lewis relative to the Denver Tramway having a perpetual franchise over the streets of Denver and that it will carry the case direct to the United States Supreme Court.

Investigation Recommended. — In a recent report to Mayor Kendrick of Philadelphia, Pa., City Solicitor Gaffney stated that he believed an investigation should be made into the operation of the Philadelphia Rapid Transit Company. The communication was in compliance with a request by the Mayor for an opinion regarding the company's purpose to increase the dividend rate on its stock from 6 to 8 per cent and to give Mitten Management, Inc., extra compensation estimated at upward of $300,000 a year. In his letter to the Mayor Mr. Gaffney pointed out alleged discrepancies in P.R.T.'s annual report and figures submitted to the Public Service Commission at the time the company applied for the latest fare increase. He said further that he recommended, as he did in his letter of Jan. 21, the passage of an ordinance appropriating $75,000 for the carrying on by the city of such investigation. At a subsequent meeting Councilmen were divided on the advisability of granting the $75,000.

City Not Party to Suit.—Newspaper reports from Shreveport, La., state that the time has expired for the filing of opposition by the city to the petition of the Shreveport Railways asking for an increase in fares from 6 cents to 7 cents. The company petitioned for the higher fare more than 60 days ago. Following the newspaper comment that the city was too late and that the case could be proved by default, Mayor L. E. Thomas issued a statement in which he said that the city was no party to the suit brought by the company before the Louisiana Public Service Commission. He said further that the proceeding was an *ex parte* one and that the company was compelled to furnisn to the commission sufficient evidence to justify any judgment rendered.

Rates Approved. — The New York Public Service Commission has approved the amended tariff of the International Railway applying to service on the Buffalo-Tonawanda-Gratwick and Kenmore-Tonawanda lines. The rate between Buffalo and Kenmore has been changed from 7 cents cash fare, four tickets for 25 cents to 8 cents cash fare with two tickets for 15 cents. The new ruling became effective on March 19. The commission has also approved the tariff applying to passenger service on the Buffalo-Lancaster division of the International Railway, which provides that tickets sold in strips of two will be accepted on cars of this line and applied in part payment of through fares as the equivalent of 8 cents. It also provides that passengers boarding local cars in Buffalo, upon payment of the local fare and application to the conductor, will receive a transfer, which, when presented by original purchaser to a conductor on the Buffalo-Lancaster division, will entitle purchaser to a credit, equal to the local fare so paid, toward the payment of fare on the interurban.

Foreign News

London Dividends Declared

Final dividends were declared on Feb. 5, for the year 1924, on the stocks of the London Underground group of companies. The rates for the whole year were as follows:

Company	Per Cent
Metropolitan District Railway (ordinary)	3½
London Electric Railway	4
Central London Railway (deferred)	4
City & South London Railway	4
London General Omnibus Company	6

These are all at the same rates as the dividends of the previous year, except in the case of the bus company, which paid 9 per cent for 1923. The bus company dividend, unlike those of the others, is free of income tax.

German Electrification Plans

Information regarding the electrification of the German railway system was given out at a recent meeting of the German Association of Architects and Engineers in Berlin. The greatest progress has been made in Bavaria, this being largely due to the abundant water-power resources. Work is nearing completion on the electrification of the Munich-Garmisch line. Financial credits have been secured for the conversion of the Munich-Rosenheim-Kufstein line.

The projected electrification work for 1926 includes the Munich-Ratisbonne and the Halle-Magdeburg lines. At a later date it is intended to convert the Berlin-Munich lines via Progstzella and via Hof and other lines which will link up the sections already electrified in Saxony and Silesia. There are 600 km. of electrified lines now operating.

Glasgow Railways May Electrify

Electrification of the underground and surface railways in Glasgow, Scotland, is now under discussion. The Town Council's health committee has passed a resolution asking the Town Council to promote an order in Parliament providing that within a certain number of years the railways within the city should be electrified, and that thereafter no steam locomotive should be used in that area. The object of this move is to diminish the smoke, which is pronounced in Glasgow.

Some time ago electrification of the underground lines in Glasgow was considered, but was turned down on the ground that the possible traffic increase would not allow a return on the additional capital expenditure.

Tramway Passes Given as School Prizes.—A free pass on the tramcars for one year has been offered by the Tramways Committee, West Ham, England, as a prize for the best essay on the 21st anniversary of the local tramway undertaking. The second prize is a free pass for six months and the third prize a free pass for three months.

Financial and Corporate

Valuations Before Courts

St. Paul and Minneapolis Procedures Regarded Largely as Formalities in Connection with Fare Matters

The Minnesota Railroad and Warehouse Commission and the St. Paul City Railway have appealed to the Minnesota Supreme Court from an order of Judge R. D. O'Brien of the Ramsey County District Court which required the commission to make a return to the court of its findings published March 6 as to the valuation of the property of the railway. The return was to have been made March 9, but the time was extended to March 14. An endeavor will be made to have the case advanced on the calendar for April review.

Notice of the appeal was served on Corporation Counsel C. F. McNally and his assistant, A. A. Stewart, who instituted the suit against the commission for an order to show cause, they said, in an effort to protect the rights of the public by getting a court decision as to whether the commission's valuation order is final.

The appeal comes upon the refusal of the court to quash the order to show cause, on petition of the commission, et al. It was maintained by the petitioners, the commission and Judge D. F. Simpson of counsel for the company that the findings on valuation by the commission and returned March 6 do not constitute an appealable order and that therefore there was nothing to return. They question the jurisdiction of the court on the ground no final order has been filed. The court held that until it had examined the findings it could not decide whether they constituted an appealable order.

These proceedings are another step in the commission's exercise of a function to determine a fair rate of fare.

As a matter of precaution the city of Minneapolis has appealed to the Hennepin County District Court from the valuation of $25,300,000 placed on the property of the Minneapolis Street Railway in the process of determining a proper permanent rate of fare. This is only a precaution and does not indicate the city will fight the valuation, although the company will ask a 7-cent fare instead of the 6-cent emergency rate in effect now, it is understood. The action is based on the fact that on April 30 the Supreme Court will hear St. Paul's appeal from the valuation placed in rate finding proceedings on the property of the St. Paul City Railway. City Attorney N. M. Cronin said that if the Supreme Court should hold with St. Paul that the valuation fixed by the commission on the property of the St. Paul City Railway was final the 30-day period in which the city might appeal would have gone by, and so to protect itself the city had served notice.

The Senate committee on general legislation has recommended for passage a bill introduced by St. Paul Senators allowing the Minnesota Railroad and Warehouse Commission to establish a metropolitan district of Minneapolis and St. Paul with a single rate of fare, where now there is a rate of one fare of 6 cents in either city and 12 cents for interurban traffic between the intercity political limits. This measure will complicate the rate fixing proceedings before the commission if it is passed and signed. Another bill up for public hearing transfers control of the railways in Minneapolis, St. Paul and Duluth from the commission back to the several city councils.

The first bill is opposed by Minneapolis on the ground that inasmuch as the Minneapolis Street Railway carried 51,000,000 more passengers last year than did the St. Paul City Railway under the proposed law 4.8 per cent of the riders would be benefited, or the proportion that travels from one city to the other, and Minneapolis riders would lose more than $1,000,000 a year thereby.

1,492,727,542 Ride Surface Lines

Results for Year in Chicago Considered Satisfactory—Residue Receipts $11,506,717—$92,240,480 Paid to City for the Eighteen Years of Present Contract

A YEAR of intensive expansion of facilities and energetic cultivation of customer good will is indicated by the annual reports of the Chicago Surface Lines and the companies comprising them, the Chicago Railways, Chicago City Railway, Calumet & South Chicago Railway and the Southern Street Railway. Total earnings were $58,081,700, the highest in the history of the consolidation except the year of 8-cent fare, 1922.

Residue receipts were $11,506,717, from which the deduction of 5 per cent on purchase price was $8,127,158. The net is divisible under the franchises 55 per cent to the city and 45 per cent to the companies. Thus the city received $1,611,257. The income accounts of the two major divisions of the surface lines show:

	Residue Receipts	Net Income
Chicago City Railway	4,602,687	1,444,888
Chicago Railways	6,904,030	777,173

The Chicago City Railway paid four quarterly dividends of 1½ per cent each on the $18,000,000 of capital stock, the dividend amounting to $1,080,000 and leaving $364,188 to be carried to the surplus fund, which at the close of the year was $2,829,349. The company paid off $136,000 loans representing capital expenditures of previous years. The Chicago City Railway report was delivered by Leonard A. Busby, president, separate from the Surface Lines report.

The year was noted as a record breaker from the standpoint of passengers carried. Henry A. Blair, president of the Surface Lines, points out that in April, 1924, the high month, the daily average of revenue passengers carried was 2,352,285, while on Dec. 24 the staggering total of 4,657,793 (2,674,064 revenue) was registered. The percentage of revenue passenger increase was 0.64. The accompanying table shows the average and totals for four years. The increase in car-miles was 4.14 per cent.

The lines added 98 double-truck passenger cars, which brought the total to 4,008 (all kinds). Seventy-three were built in the company shops and 25 were in process of construction. The number of cars overhauled was 1,000, a record. There was an increase in the use of multiple-unit trains and in one-man cars, which are being used on fourteen routes. Under the heading operation, Mr. Blair says:

> In pursuance of our established policy of service improvement, much was accomplished during the year covered by this report. All of the 317 new cars purchased since Feb. 1, 1923, are in operation, and there was an increase of 5,000,000 in car-mile operation in 1924 and 1925 as compared with the previous fiscal period. A total of 1,000 cars was overhauled and painted, an increase of 197, or 24 per cent, over the preceding year. Practically all car schedules of the system have been rewritten, some of them several times, to secure more efficient use of equipment and to meet changing traffic conditions. Wages of the trainmen's organization were increased 3 cents an hour during the first four months of the year over a corresponding period in 1923 and 2 cents more from June 1, in compliance with the arbitration award of the previous year. Our trainmen are the highest paid platform men in the electric railway industry.

Rerouting in the loop district elimi-

EARNINGS, EXPENSES AND DIVISION OF RESIDUE RECEIPTS OF CHICAGO SURFACE LINES FOR TWELVE MONTHS ENDED JAN. 31

	1924	1923
Earnings:		
Passenger car (including M. C.)	$57,284,602	$56,986,257
Chartered cars	7,177	7,842
Newspaper cars	14,515	15,078
Freight earnings	4,786	5,023
Hospital car service	5,668	5,870
Advertising	267,775	260,850
Rents of buildings, etc.	155,085	147,354
Sale of power	254,451	95,500
Interest on deposits	104,948	126,550
Miscellaneous	14,673	15,000
Gross earnings	$58,081,678	$57,655,164
Expenses:		
Way and structures	$2,859,869	$2,682,906
Equipment	4,148,282	5,855,800
Rentals	4,646,534	4,612,440
Power—Maintenance	376,062	360,195
Power—Operation	3,466,857	3,321,658
Conducting transportation—railway	20,890,865	19,640,720
Conducting transportation—other	3,177,461	3,090,500
Traffic	102,793	44,200
General and miscellaneous—damages	2,439,430	2,421,510
General and miscellaneous—other	1,551,803	1,695,740
Taxes	2,915,000	3,170,000
Total expenses	$46,574,960	$44,889,700
Residue receipts	*$11,506,717	*$12,765,464
Divided:		
Chicago Railways—60 per cent	*$6,904,030	*$7,689,278
South Side Lines—40 per cent	*4,602,687	*5,126,186

*Includes city's 55 per cent of net divisible [illegible] as defined by ordinances. See accompanying [illegible]

COME STATEMENT OF CHICAGO RAILWAYS FOR YEAR ENDED JAN. 31, 1925

ompany's share (60 per cent) of residue receipts of Chicago Surface Lines	$6,904,030
Deduct: Joint account expenses	225,000
	$6,679,030
Deduct: Interest at 5 per cent on capital valuation	4,684,130
Income divisible with city of Chicago	$1,994,900
City's 55 per cent of divisible income	$1,097,195
ompany's income:	
45 per cent of divisible income	$897,705
5 per cent interest allowance on capital valuation of property	4,684,130
Interest on bank balances	109,253
Interest on treasury securities	79,057
Total income	$5,770,146
eductions:	
Interest accrued on—	
First mortgage bonds	$2,784,700
Consolidated mortgage bonds	1,711,221
Purchase money bonds	203,650
Interest on loans	52,621
Federal income tax on interest coupons	67,500
Corporate expenses and interest adjustments with Chicago Surface Lines	173,280
Total deductions	$4,992,973
Net income	$777.173

INCOME STATEMENT OF CHICAGO CITY RAILWAY FOR YEAR ENDED JAN. 31, 1925

40 per cent of the residue receipts of Chicago Surface Lines	$4,602,687
Deduct: Joint account expenses, interest on capital investment of the Chicago City Railway, Calumet & South Chicago Railway and Southern Street Railway	3,668,028
Net earnings of South Side Lines	$934,658
City's 55 per cent as per ordinances	514,062
South Side Lines' 45 per cent as per ordinances	$420,596
Less: Southern Street Railway's proportion, as per ordinance	23,132
Company's proportion	$397,463
Add: Interest on capital investment	2,780,378
Income from operation	$3,177,842
Other income	17,526
	$3,195,368
Interest on bonds and notes outstanding	1,751,180
Net income	$1,444,188
Add: Surplus at Jan. 31, 1924	2,465,160
Surplus	$3,909,349
Dividends, 6 per cent	1,080,000
Surplus at Jan. 31, 1925	$2,829,349
Percentage of net income to capital stock at par	8.02%

TRACK MILEAGE RECORD OF CHICAGO SURFACE LINES

	Total Miles Single Track 1-31-24	Extension 1924	Abandoned 1924	Net Extension 1924	Total Miles Single Track 1-31-25	*Reconstructed 1924
hicago Railways	587.98	3.39	†0.21	3.18	591.16	25.17
icago City Railway	332.27	3.06	....	3.06	335.33	5.13
alumet & South Chicago Railway	125.57	1.69	†0.07	1.62	127.19	4.57
uthern Street Railway	17.25	....	....	....	17.45	1.33
Total	1,063.27	8.14	†0.28	7.86	1,071.13	36.20

* Includes track taken up and replaced account of sewers, special straight track renewals, etc.
† Decrease.

COMPARISON OF TOTAL AND AVERAGE PASSENGERS OF CHICAGO SURFACE LINES

Year Ended	Weekday Average	Saturday Average	Sunday* Average	Total for Year
n. 31, 1925	2,373,114	2,512,121	1,614,823	830,151,540
n. 31, 1924	2,354,139	2,521,487	1,623,414	824,850,103
n. 31, 1923†	2,204,425	2,396,385	1,563,911	762,629,211
n. 31, 1922	2,129,217	2,251,293	1,560,310	750,515,622

* Includes holidays. † Trainmen's strike Aug. 1 to 6, 1922, inclusive.

RE-WAR AND POST-WAR COMPARISON OF SURFACE LINES OPERATION AT CHICAGO

	1914	1924	Per Cent Increase
ss earnings	$31,966,049	$58,081,678	81.70
erating expenses	19,889,276	46,574,960	134.17
erating wages	10,560,039	29,246,381	176.95
al wages paid	12,379,615	31,921,796	157.86
venue passengers carried	627,731,550	830,151,540	32.25
tal rides	1,115,312,129	1,492,727,542	33.84
erage fare per revenue passenger	4.99 cents	6.90 cents	38.28
erage fare per ride	2.81 cents	3.84 cents	36.65
ainmen in service	8,847	11,248	27.14

CAPITAL EXPENDITURES BY CHICAGO COMPANIES FOR YEAR ENDED JAN. 31, 1925

	Chicago Railways	Chicago City Railway	Southern Street Railway	Chicago & South Chicago Railway	Total
rchase price at Feb. 1, 1924	$93,485,088	$55,485,101	$1,723,397	$11,467,541	$161,161,129
pital expenditures during year	278,392	127,951	57,064	138,486	601,895
per cent on same	41,758	19,192	8,559	20,772	90,284
crease in depreciated assets	172,795	115,196	.....	.....	287,992
per cent on same	8,669	5,779	.....	.....	14,449
rchase price at Feb. 1, 1925	$93,986,704	$55,753,221	$1,789,022	$11,626,801	$163,155,750

STATISTICAL DATA OF CHICAGO SURFACE LINES FOR THE FISCAL YEARS ENDED JANUARY 31, 1925

	1918 5 cents	1919 5 cents	1920 5-7 cents	1921 6-8 cents	1922 8 cents	1923 8-6¾ cents	1924 7-6¾ cents	1925 7-6¾ cents
ue o. fare								
venue passengers	692,815,889	685,300,718	743,746,584	769,025,413	750,515,622	762,629,211	824,850,103	830,151,540
ssenger receipts	$34,566,601	$34,186,578	$43,417,639	$54,726,740	$59,706,412	$55,495,310	$56,986,687	$57,284,602
tal earnings	35,114,633	34,710,097	43,963,438	55,327,384	60,343,733	56,103,061	57,655,169	58,081,678
erating wages	12,854,406	14,768,088	19,854,173	28,204,341	29,676,981	27,163,996	27,458,736	29,246,390
her operating expenses and taxes	10,247,289	10,963,848	13,399,841	15,096,050	16,839,168	17,252,072	17,381,016	17,328,569
ssible receipts	12,012,957	8,978,160	10,709,423	12,026,992	13,827,583	11,686,992	12,815,416	11,506,717
Less: Joint account expenses	648,205	179,831	181,862	164,733	449,000	620,000	885,000	450,000
	$11,364,731	$8,499,329	$10,527,561	$11,862,258	$13,378,583	$11,066,992	$11,930,416	$11,056,717
per cent on purchase price	7,661,542	7,802,574	7,893,292	7,974,289	8,024,104	8,039,343	8,076,569	8,127,158
per cent to city	2,036,755	383,215	1,448,847	2,138,383	2,944,963	1,665,206	2,119,615	1,611,257
per cent to companies	1,666,435	313,539	1,185,420	1,749,586	2,409,515	1,362,442	1,734,231	1,318,301

nated 11,000 turns a day at congested corners. The average gain for each car in getting away from loop crossings was 20 seconds.

The attitude of the city administration and the Illinois Commerce Commission was favorable and the latter adopted a policy that it was uneconomical for the company to make extensions in streets where the city has not extended sewers, water mains and other underground improvements.

Bus expansion was vigorously contested and will continue to be so contested, the report notes. Application to expand the boulevard and park bus systems into general transportation systems are pending and numerous efforts have been made to extend bus service to outlying and suburban districts. However, a number of these applications have been amended so as to eliminate routes which would compete or interfere with the Surface Lines.

In the printing department 1,895,552,000 transfers were printed at a cost of $99,959, or 5.21 cents a thousand, as compared with 1,823,183,000 transfers printed last year.

The Surface Lines were under the management of Guy A. Richardson during the period covered by the report.

A total of $92,240,480 has been paid to the city by the companies for the eighteen years under the present ordinances, including $14,458,000 for street paving, $9,102,000 for cleaning and sprinkling right of way, $5,186,000 for maintenance paving and $27,260,000 for general taxes. The major item was the city's 55 per cent of net revenue, which totaled $34,352,492 and, with interest accretions, constitutes a fund of $40,000,000, which is the impetus for a $640,000,000 municipal ownership and subway proposal now before the voters.

E. A. Cudahy an Illinois Power & Light Director

The annual meetings of the Illinois Power & Light Corporation and its subsidiary, Illinois Traction, Inc. (Illinois Traction System), were held at Chicago, on March 16. Clement Studebaker, Jr., president, presented the annual report for the calendar year 1924. It showed the progress made in the properties operating in the States of Illinois, Iowa, Kansas and Nebraska.

The old officers and directors were re-elected, with the following changes:

E. A. Cudahy, Jr., Chicago, vice-president of the Cudahy Packing Company, was elected director of the Illinois Power & Light Corporation to succeed H. E. Chubbuck, Peoria, Ill. P. C. Dings, Chicago, one of the directors, was elected treasurer, to succeed George M. Mattis, Champaign, Ill.

Comment on D. U. R. Report

Remarks of Late President Stevenson on Outlook for Company Optimistic —Statistics Disappointing

The net income of the Detroit United Railway, Detroit, Mich., for the year ended Dec. 31, 1924, after payment of all taxes and interest charges, was $302,172, including profits on the purchase of 4½ per cent bonds during 1924, used to take down payments of $150,788 made by the city to the Security Trust Company. For the year 1923 the net revenue of the company was $942,430, after deductions for operating expenses, maintenance, taxes and interest payments made on bonded and other indebtedness.

In submitting the report for the year 1923 the late E. G. Stevenson, president, expressed the opinion that there was no reason to expect any diminution of earnings that would interfere with the continuation of the payment of dividends. For the first four months of 1924 the company experienced its greatest period of prosperity as compared with any similar period since the road was operated as a purely interurban property, but from May a general industrial depression occurred which especially affected the railway. Mr. Stevenson explained that in consequence of this and of the ever-increasing competition of buses operating on routes paralleling the principal interurban railways there was a decrease of $568,024 in the gross revenue from passenger traffic alone in the last eight months of the year as contrasted with the similar period in 1923.

Said Mr. Stevenson:

The increase in the operating expenses as compared with the previous year is more than accounted for by increased wages for platform men and other classes of labor which were in effect for only a part of 1923 and by additional car mileage run to meet the competition of buses. In addition, there was an unusually large expenditure on car equipment, which is now on the whole in much better condition than for some years past; indeed, this can be said of all the company's properties.

The competition of buses became so onerous both as regards frequency of service and reduction in fares that finally in the autumn of 1924 the board, after careful consideration, decided it would be necessary to effect arrangements that would result in the co-ordination of service between the buses and the railways, and a large expenditure has been made since that time in effecting such arrangement.

The directors are glad to be able to state that they confidently anticipate very substantial savings in the operating expenses of the railways in the year 1925 as compared with 1924, and this without any impairment of efficiency or of reasonable service to the public. These savings will be brought about mainly by the operation of electric cars by one man instead of by two men, the purchase of electric power instead of generating it ourselves, the substitution of buses for electric cars in the city of Detroit for the transportation of interurban passengers between your interurban lines and your central interurban station and the co-ordination of railway and bus services on all important routes, thus very appreciably reducing the mileage run by cars and buses.

Very substantial savings in these directions have already been made and in the aggregate your directors estimate the reductions in the operating expenses of your railways in 1925 as compared with 1924 at about $800,000.

Increased passenger fares now effective will, it is estimated, result in the addition of about $350,000 in the gross revenue in the year 1925 as contrasted with 1924, assuming that there is the same volume of traffic in both years.

During the year $9,000,000 of Detroit United Railway five-year 6 per cent first mortgage collateral trust sinking fund bonds were sold. The sinking fund for these bonds is $1,000,000 pe annum, payable for the first thre years out of money owing by the cit of Detroit for the purchase of the cit lines and in addition $500,000 pe annum, for five years, payable by th company. During the year $750,000 c this sinking fund became due and wa paid, of which $500,000 came fro money owned the company by the cit and $250,000 was paid by the compan At the end of the term of this mor gage, viz., five years, it will be reduce to $3,500,000 by sinking fund payment The proceeds of the $9,000,000 iss were absorbed mainly in retiring u

EARNINGS AND INCOME OF DETROIT UNITED RAILWAY FOR YEAR ENDED DEC. 31, 1924

Gross earnings from operations:		
Passenger		$6,773,475
Freight and express		1,520,625
Mail		35,100
Special car		65,309
Bus		77,316
Total earnings from operations		$8,360,035
Deduct—Operating expenses before providing for depreciation		7,275,797
Net earnings from operations		$1,084,238
Add—Proportion of interest received with respect to balance owing by city of Detroit for purchase of company's city properties	$214,509	
Other income	478,415	692,924
Gross income, less operating expenses		$1,777,163
Deduct — Interest on funded and floating debt	$1,736,433	
Less — Proportion of interest received with respect to balance owing by city of Detroit credited upon the books of the company to interest on funded debt	702,710	$1,033,723
Taxes		592,055 $1,625,779
Balance—Income for the year before making provision for depreciation and contingencies transferred to surplus account		$151,384

STATEMENT OF SURPLUS OF THE DETROIT UNITED RAILWAY

Balance at Jan. 1, 1924		$4,434,788
Deduct: Adjustment resulting from compromise agreement with city of Detroit Department of Street Railways for rent of tracks and facilities, etc., applicable to prior years (net)	$175,074	
Accounts receivable written off less adjustment of terminal charges in city of Toledo applicable to prior years	11,933	187,008
Balance at Jan. 1, 1924, as adjusted		$4,247,779
Add: Income for the year ended Dec. 31, 1924, before making provision for depreciation	$151,384	
Discount on securities retired	150,788	302,172
Together		$4,549,951
Deduct: Discount and expenses on securities sold during the year	$905,385	
Premium on bonds retired during the year	246,000	
Expenses in connection with ten-year operating agreement on Wyandotte Division	19,159	
Dividends paid—3 per cent	460,750	1,631,294
		$2,918,657

PASSENGER STATISTICS OF THE DETROIT UNITED RAILWAYS

	1924	1923
Revenue passengers carried	49,354,117	53,671,114
Free transfers	3,382,125	3,895,242
Employees	915,837	930,785
Total	53,652,079	58,497,141
Receipts per revenue passenger (cents)	13.68	13.52
Receipts per total passenger (cents)	12.58	12.41

MILEAGE STATISTICS

	1924	1923
Revenue car mileage	20,219,887	18,999,266
Earnings per car-mile (cents)	41.34	46.6
Expenses per car-mile (cents)	35.98	38.1
Net earnings per car-mile (cents)	5.36	8.5
Track mileage	613.89	603.7

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Mar. 1925 7.26	Feb. 1925 7.24	Mar. 1924 6.93	Mar. 1925 7.26	May 1920 6.88
Street Railway Materials* 1913 = 100	Mar. 1925 158.4	Feb. 1925 153.1	Mar. 1924 163.9	Sept. 1920 247.5	Oct. 1924 148.5
Street Railway Wages* 1913 = 100	Mar. 1925 221.5	Feb. 1925 221.0	Mar. 1924 217.4	Sept. 1920 232	Mar. 1923 206.8
Steel—Unfilled Orders (Millions) Tons 1913 = 5.91	Feb. 28 1925 5.28	Jan. 31 1925 5.04	Feb. 29 1924 4.91	July 31 1920 11.12	July 31 1924 3.19
U. S. Bank Clearings Outside N. Y. City (Billions)	Feb. 1925 15.67	Jan. 1925 18.53	Feb. 1924 14.79	Mar. 1920 18.54	Feb. 1922 10.65
Business Failures Number	Feb. 1925 1651	Jan. 1925 2344	Feb. 1924 1572	Jan. 1924 2231	Sept. 1924 1277
Liabilities (Millions)	41.17	64.01	74.80	122.95	27.71

Conspectus of Indexes for March, 1925

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Mar. 1925 219.2	Feb. 1925 209.7	Mar. 1924 724.6	June 1920 273.8	Mar. 1922 162.0
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Feb. 1925 160.6	Jan. 1925 160.0	Feb. 1924 151.7	May 1920 247	Jan. 1922 138
Bradstreet's Wholesale Commodities 1913=9.21	Mar. 1 1925 13.84	Feb. 1 1925 13.89	Mar. 1 1924 12.90	Feb. 1 1920 20.87	June 1921 10.62
Dun's Wholesale Commodities 1913 = 120.9	Mar. 1 1925 201.9	Feb. 1 1925 204.6	Mar. 1 1924 190.7	May 1 1920 263.3	July 192 159.
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Feb. 1925 151.4	Jan. 1925 154.3	Feb. 1924 147	June 1920 219	Mar 192 139
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Feb. 1925 165.3	Jan. 1925 167.1	Feb. 1924 163.9	July 1920 204.5	Aug 192 154.

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wages of motormen, conductors and operators on 100 of the largest street and interurban railways in the United States, weighted according to the number of such men employed.

derlying bonds and in payment for 4½ per cent bonds that had been purchased to take over the city of Detroit payments, which bonds were placed under the mortgage to provide for payments into the sinking fund of $1,000,000 per annum for the first three years.

In addition, during the year, $1,000,000 of Detroit United Railway 6 per cent ten-year equipment trust certificates were sold, secured by new electric cars and buses purchased. The sinking fund for these trust certificates will redeem them at the end of ten years.

$2,600,000 for Betterments

The sum of $2,608,020 was expended during the year on additions and betterments to the properties. In addition $1,813,416 was expended on way and structures and equipment and charged to operating expenses.

Large expenditures had to be made during the year to secure the co-ordination of competing bus services, for the purchase of buses and cars, for the provision of transfer stations and other facilities in connection with the substitution of buses for cars in the city of Detroit, for the fulfillment of obligations to municipalities and for necessary additions and betterments. Mr. Stevenson quite frankly said that further financing was necessary to reimburse the treasury for these disbursements.

Deficit in February in Toledo

Despite the highest average of revenue passengers carried per day since May, 1924, February operation of the Community Traction Company, Toledo, resulted in a deficit of $1,774, according to the report of Commissioner E. L. Graumlich submitted to the board of control at its regular meeting. Gross revenue was $308,259 and operating expense $216,589. Considerable savings are shown over last year in cost of transportation, power and general expense. Maintenance ran $40,000 ahead of February, 1924, due to a clean up of job orders. Auxiliary bus service showed a loss of $1,683.

A total of 4,087,510 revenue passengers was carried, averaging 7.91 per car-mile operated. The daily average was 145,982, compared with 182,092 at the industrial peak of last year, which came in the corresponding month.

The railway was forced to borrow nearly $100,000 recently for payment of bond interest and this is reflected in an increase in interest on floating debt. There is a shrinkage in income from track rentals due to the abandonment of city service by interurban lines.

February Poor Month in Grand Rapids. — With a drop in passenger revenue of $18,708 in February under the similar month in 1924 the Grand Rapids Railway, Grand Rapids, Mich., lacked $16,699 of meeting its expenses and its allowed 7⅞ per cent return on its valuation. This boosted the deficit in the equalization account to $158,747. The number of passengers carried during the month was 15.76 per cent under February, 1924. The company in December and January met its expenses and also the allowed return on its valuation.

Net Income Decreases

Duluth-Superior Traction Company Reports Elimination of Jitney Has Increased Passenger Revenue

Gross revenues of the Duluth-Superior Traction Company, operating in Duluth, Minn., and Superior, Wis., for the year ended Dec. 31, 1924, showed a decrease of $118,575, compared with the previous year. The enforcement of the bus regulatory ordinance and improved general business conditions during the last four months of the year reduced this rate of decrease. These facts were contained in the annual report of the company, recently submitted to the stockholders by A. M. Robertson, president. Operating expenses showed a decrease of $14,929. The net income, transferred to profit and loss, also showed a decrease of $81,107 compared with the year 1923. During the year $55,933 was expended for renewals and charged against depreciation reserve. Additions to property during the year took $109,296.

The president of the company says that the officers have considered bus transportation as a feeder to street car lines and accordingly on Dec. 3 of last year organized the Duluth Coach Company, which purchased and put into operation on Dec. 18 an automobile coach as a feeder to a street car line, thus serving a residence district which had previously been without any public transportation service.

The report states that unfair jitney competition existed in the city of Duluth for two years prior to the fall of 1924 in spite of every effort made by the management to bring about proper regulation. At a special election held on June 16, 1924, an initiated bus ordinance was adopted. Under this ordinance jitneys are prohibited between the hours of 6 a.m. and 10 p.m. from operating on the streets in the city upon which a double-track railway is constructed and operated. This ordinance has so far been sustained by the courts, but an appeal is now pending in the Minnesota State Supreme Court. As a result of this jitney elimination the company's passenger revenue has been materially increased.

Mr. Robertson called the attention of the stockholders to the report for the year 1923, on the special master's report in the company's rate case then pending in the United States District Court. The case came up for argument before the court on the exceptions to the master's report on June 4 and 5, 1924, and on Dec. 29, last, the court decided that "the fair value of the property in Duluth as of Dec. 31, 1921, was increased from $4,600,000 to $5,009,510." The state commission's finding that the company was entitled to a rate of return on the fair value of the property of 7½ per cent was sustained. The temporary injunction permitting the collection of a straight 6-cent fare and restraining the enforcement of the commission's rate of 6 cents cash and five tickets for 25 cents was made permanent.

The number of revenue passengers carried in 1923 was 31,343,815, compared with 29,204,274 in 1924. The average total of all tracks reduced to single track during 1924 was 108.32 miles.

DULUTH-SUPERIOR TRACTION COMPANY —CONSOLIDATED INCOME STATEMENT

	1924	1923
Total railway operating revenues	$1,789,402	$1,904,606
Railway operating expenses:		
Way and structures	$206,146	$220,200
Equipment	194,919	188,997
Power	175,939	170,738
Conducting transportation	689,660	695,460
Traffic	967	751
General and miscellaneous	228,404	233,850
Transportation for investment—credit	—9,980	—9,009
Total railway operating expenses	$1,486,058	$1,500,987
Net revenue railway operation	$303,343	$403,618
Taxes assignable to railway operation	$113,313	$134,991
Operating income	$190,029	$268,627
Non-operating income:		
Income from funded securities	$8,713	$9,088
Income from unfunded securities and accounts	2,050	4,694
Income from sinking fund and other reserves	14,199	14,203
Miscellaneous income	397	743
Total non-operating income	$25,359	$28,730
Gross income	$215,389	$297,357
Deductions from gross income:		
Interest on funded debt	$172,651	$173,637
Interest on unfunded debt	127	.....
Miscellaneous debits	606	609
Total deductions from gross income	$173,385	$174,247
Net income transferred to profit and loss	$42,004	$123,110
General mortgage sinking fund payment	$23,912	$25,284

North American Company Has Its Best Year

The North American Company, New York, finished 1924 with the largest gross and net incomes in its 35 years history. Gross earnings for 1924 were $80,117,255, an increase of $4,651,988, or 6.16 per cent. Net income from operation was $29,955,492, an increase of $2,779,423, or 10.23 per cent. This increase in net income from operation is approximately 60 per cent of the increase in gross earnings. Of net income from operation, electricity and heating supplied 80.21 per cent, railway 10.37 per cent, gas 3.51 per cent, and coal and miscellaneous 5.91 per cent. Among the properties controlled are the Milwaukee Electric Railway & Light Company and the East St. Louis & Suburban Railway group.

Balance for depreciation reserves, dividends and surplus increased from $16,253,454 to $18,378,576, or after deduction of dividends on preferred stock, an increase of from $5.70 to $5.83 per share of common stock outstanding at the close of 1923 and 1924 respectively. After all charges for depreciation reserves and dividends on preferred stock consolidated earnings were equivalent to 31.6 per cent of the par value of North American common stock outstanding on Dec. 31, 1924. In December, because of favorable market conditions, more than $19,000,000 of financing was done for subsidiaries in anticipation of 1925 construction requirements, but no earnings are yet available from the proceeds thereof.

Expenditures for maintenance of the

plants and system of the subsidiary companies were $5,789,024, all of which were included in operating expenses and $7,795,811 additional was appropriated for reserves for depreciation.

A world's economy record is believed to have been attained in the steam generation of electricity. At any rate, the North American system was able to reduce its operating ratio more than 2 per cent below 1923, despite an increase of more than 5 per cent in taxes, for which an amount equal to more than 8 per cent of gross was expended or set aside. The system's generating stations as a whole produced 9.3 per cent more energy in 1924 than in 1923, with a coal saving equivalent to 330,000 tons, or 15.9 per cent.

Purchases made or arranged in 1924 included 99 per cent of the common stock of the Peninsular Power Company, operating in Wisconsin and Northern Michigan; the 23-story office building at 60 Broadway, New York, in which permanent headquarters are now established, and two coal properties in Kentucky, the acquisition of which makes the West Kentucky Coal Company the largest in the West Kentucky field, with an annual productive capacity exceeding 5,000,000 tons.

Receivership at Detroit a Protective Measure

Hope has been expressed by Joseph W. Simard, one of the receivers of the Detroit United Railway, Detroit, Mich., that the company will soon be taken out of receivership. Mr. Simard is vice-president of the Municipal Debenture Corporation, Montreal, and is acting with the Security Trust Company, Detroit. A plan has been worked out which is expected will be successful, as it is believed that the conditions that made receivership expedient will not prevail permanently.

It was stated in Detroit that the receivership announcement occasioned little surprise in financial circles, but it had been hoped that the crisis might be delayed if not averted.

It was suggested in some quarters that the receivership might have been averted had Elliott G. Stevenson, president, lived to submit a plan of procedure intended for the recent board meeting. This meeting had been called by Mr. Stevenson and although his failing health prevented him from attending the proceeding he had hoped to keep in touch with matters by telegraph.

It is understood that Mr. Simard will divide his time between Detroit and Montreal. The plaintiff was granted a temporary injunction by Judge Simons, restraining the D. U. R. from interfering with the receivers. The petition of the Yellow Coach Manufacturing Company to the court stated that the D. U. R. owed it approximately $25,000 which was past due and that further obligations that would be due shortly would total $276,670. This indebtedness was the result of recent purchases of buses by the D. U. R.

The petition conceded that the railway's assets represent a value approximately 50 per cent in excess of all indebtedness and liabilities, but the company had no means at hand to meet its immediate pressing needs. Apprehension was expressed lest some of the creditors bring suits in respect to their claims and levy attachments and executions. This would have hampered operation and created a danger that one or more of the lines now operated as a united system might be cut off from central control and operation. It was contended as essential that the property of the defendant should not be sacrificed or broken up.

Railway Earnings Eight per Cent of Total.—For the fiscal year ended Dec. 31, 1924, the Middle West Utilities Company, with main office in Chicago, Ill., reports total gross earnings of $41,402,607. Of this amount the railway earnings were $3,362,213, or 8.1 per cent of the total. The report gives detailed statistics on the subsidiary operating companies, but does not segregate the electric railway operation from its other utility operations.

Will Pay Bonds.—The $700,000 of 5 per cent bonds of the Butte Electric Railway, Butte, Mont., due March 1, were paid off at maturity, at the office of W. A. Clark & Brothers, Butte, Mont.

Another Property for American & Foreign.—Interests associated with the American & Foreign Power Company, Inc., New York, have bought control of the Empresa de Luz i Fuerza Electrica, S. A., serving with electric power and light and electric railway the city of Guayaquil, Ecuador.

Preferred Stock to Be Sold.—At the recent annual meeting of the stockholders of the Puget Sound Power & Light Company, Seattle, Wash., a new issue of 40,000 shares of preferred stock was authorized. The stock will be sold from time to time to furnish money to enable the company to carry on its new construction of substations, transmission and distribution lines.

Submits Purchase Offer.—The Illinois Power & Light Corporation has offered to purchase the Galesburg & Western Railroad, Rock Island, Ill., from county, township, city and school officials, with whom rests responsibility for ordering such a sale. The Illinois Power, it is understood, will utilize the right-of-way for the building of its 66,000-volt transmission line from Galesburg to Monmouth. The interurban condition is such that the Illinois Commerce Commission has directed immediate improvements and protective measures if the line is to continue to operate and enforcement of this order is likely to precipitate the sale order. The Illinois Power & Light Corporation has asked the Illinois Commerce Commission to permit it to suspend operations on its Galesburg-Abingdon line. The company proposes, upon formal approval of this suspension, to substitute a bus service between the two cities.

Petition to Sell Stock.—To rebuild the Interstate Consolidated Street Railway, the present owners, Hemphill & Wells, New York, have decided to issue $500,000 in stock and perhaps a proportionate amount of bonds. They have petitioned the Public Utilities Department of Massachusetts for authority to issue the stock. At the same time they desire to change the name, by dropping the word "Consolidated," so as to call it the Interstate Street Railway. Such change in name requires the approval of the state authorities. The railway is operating in Attleboro, North Attleboro, Plainville, Wrentham and Seekonk, to the Rhode Island line.

Removal of Tracks Allowed.—The Pacific Electric Railway has been authorized by the Railroad Commission to remove its tracks from Sunset Boulevard, from Gardner Junction to the end of the line at the intersection of Sunset Boulevard and Laurel Canyon Road, in the city of Los Angeles, Hollywood District. Receipts do not justify operation and an adequate bus service is being rendered by the Los Angeles Motor Bus Company.

Net Corporate Income Falls Off.—For the eight-month period ended Feb. 28, 1925, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., fell off from the corresponding period of last year, the figures being $7,485,501 and $7,751,230 respectively. The net corporate income was $936,832 for the eight-month period of the current year against $1,292,033 for the eight-month period ended Feb. 29, 1924.

Seeks Permit for Bond Issue.—The Georgia Railway & Electric Company, Atlanta, Ga., which owns the Georgia Railway & Power Company, operator of the railway in Atlanta and vicinity, has asked authority of the Public Service Commission to issue $599,000 in refunding and improvement mortgage bonds. The proceeds are to be used to reimburse the treasurer for capital additions and extensions made during the six-month period from July 1 to Dec. 31, 1924.

Net Income Increases.—For the eight month period ended Feb. 28, 1925, operating revenues of the Brooklyn-Manhattan Transit Corporation and affiliated companies, Brooklyn, N. Y., were $28,384,142, against $25,990,928 for similar period ended in 1924. The expenses increased from $17,413,748 to $18,608,755. The net income increased from $2,245,543 for the eight-month period ended February, 1924, to $3,255,476 for the eight-month period ended February of this year.

Stocks Sales Breaks Record.—The second customer-ownership stock-selling campaign held in St. Joseph, Mo., by the St. Joseph Railway, Light, Heat & Power Company closed on Feb. 2. The employees sold 4,032 shares of the preferred stock of the Cities Service Company, by which the company at St. Joseph is controlled, in ten days. The quota of 2,500 shares had been set by the New York office. The record of the first campaign was 4,024 shares.

Deficit in 1924.—Operation by the Springfield & Xenia Railway, Springfield, Ohio, during 1924 resulted in a deficit of $15,523 compared with a deficit of $3,225 for the previous year. The gross earnings fell from $106,8 in 1923 to $95,072 in 1924. Operating expenses were $104.496 in 1923 and $106,001 in 1924. The number of passengers carried was 373.268 in 1924. In 1923 the number was 391,4 Car-miles operated in 1924 and 19 were 268,455 and 256,003 respectively.

Personal Items

New Assistant Secretary of the Treasury

General Andrews, Railway Official, Succeeds Mr. Wadsworth Under Secretary Mellon

Gen. Lincoln C. Andrews, receiver of the New York & Long Island Traction Company, the Long Island Electric Railway and the New York & Queens County Railway, Long Island City, has been appointed Assistant Secretary of the United States Treasury, succeeding Eliot Wadsworth, Boston, resigned. He has perfected arrangements to hold the receiverships.

Gen. Andrews is a man of distinguished attainments. He is the second railway man in recent years to be picked by a president to occupy a place of great trust in the Treasury. Only a few years ago Oscar T. Crosby occupied a similar post under the late President Wilson.

General Andrews once said he left the regular army after the war to try his hand in business. He has succeeded in a big way. His first real experience was the year and a half he spent as chief executive officer of the New York Transit Commission. This simply served to whet his appetite for closer contact with the railways. As a result a little more than two years ago he accepted the appointment as receiver of the New York & Queens County Railway. Of all the posts around New York in the railway field this was one of the most difficult to fill acceptably. In fact, he was chaffed by his friends at that time, and welcomed by them "to the ranks of the slaves." The outlook certainly was anything but rosy. In the twenty years before the receivership the Interborough Rapid Transit Company, by which the New York & Queens County was controlled, dumped nearly $7,000,000 into the lines and got nowhere. During all these years there was a substantial operating deficit. More than $750,000 was the estimated amount needed to put the property in condition when General Andrews took charge.

But General Andrews did find it absorbing to take the sick property, work over it and see it respond. It is probable that he did many times damn the job and all that went with it, but he was back each morning with the bit in his teeth ready for another long, hard day. Doubtless he does not feel that everything desired has been accomplished, but considering the material with which he had to work he has made a wonderful record. Among many other things he succeeded in securing an advance in fare for the New York & Queens County road to 6 cents, with the understanding that for each $100,000 paving assessment charged against the company an additional cent was to be added to the carrying fee. Moreover, the general carried the case of the railway direct to the riding public. In a particularly striking announcement made about a year ago he summarized the accomplishments during the year with the defunct railway.

General Andrews did more than take into consideration the needs of the physical property and of the public. His army training made him conscious of the value of a proper personnel, but he realized the need for adjusting army tactics of discipline to the changed condition of public life. As an incentive toward greater co-operation he put into effect on the New York & Queens County Railway a profit-sharing plan which was the subject of an article in the ELECTRIC RAILWAY JOURNAL for April 12, 1924, page 583.

General Andrews is particularly well known to electric railway men in New York State through his participation in the deliberations of the New York

L. C. Andrews

Electric Railway Association. He is also well known to railway men elsewhere through contacts that were made by him in 1921 as a member of a party of railway men and public service commission officials that made a tour of inspection of the city railway properties as far west as Kansas City..

General Andrews was appointed to the United States Military Academy from Seneca Falls, N. Y., in 1889 and was graduated in 1893. He was aid to General Sumner, commanding the cavalry division, in the Santiago campaign during the war with Spain and was a major of volunteer infantry in the Philippines and first American Governor of the Island of Leyte. Later he was instructor at the Military Academy and was active in officers' training work before the World War, in which he commanded a brigade in this country and in France. Later, as deputy provost marshal general in France, he assisted in the organization and training of the Military Police of the American Expeditionary Force.

E. C. Quinn is now superintendent of transportation of the Jacksonville Traction Company, Jacksonville, Fla.

Promotions Announced by Manhattan Surface Lines

Promotions have been announced by the New York Railways, New York, N. Y., as follows:

D. E. Lenahan, general superintendent.

J. Cowen, superintendent car equipment.

M. J. O'Connor, superintendent of transportation.

B. Carlin, superintendent way and structures.

H. J. O'Reilly, superintendent of transportation, resigned recently.

Dinner in Honor of Mr. Storrs

Lucius S. Storrs was guest of honor at a testimonial dinner given in the Lawn Club, New Haven, Conn., on the evening of March 23, by the officers and heads of departments to the Connecticut Company, of which Mr. Storrs is the retiring president. In a series of short addresses a number of his close associates in the company expressed sorrow at his going and yet congratulated him upon his new position of managing director of the advisory council of the American Electric Railway Association.

The dinner was presided over by J. K. Punderford, successor to Mr. Storrs as president of the company. Mr. Punderford introduced the speakers and read telegrams and letters from several guests who were unable to attend. At the close of the last address Joseph F. Berry, formerly connected with the Connecticut Company and now a member of a Hartford law firm, acting on behalf of those present, presented to Mr. Storrs a huge silver loving cup and a book of appreciation which contained the signatures of every one of the 3,800 employees of the company. On the wooden stand of the loving cup was engraved: "To Lucius Seymour Storrs from His Friends in the Connecticut Company in Remembrance of Many Years of Delightful Association, 1911-1925."

The speakers of the evening were: Charles C. Cheney, a Connecticut Company trustee; Leonard Daggett, trustee of New York, New Haven & Hartford Railroad; George D. Watrous, general counsel of the Connecticut Company; Edward M. Day, Hartford; J. W. Welch, secretary of the American Electric Railway Association; John W. Colton, editor of *Aera;* Joseph Berry.

Leslie Spraggon Superintendent of Equipment in Buffalo

Leslie Spraggon, superintendent of equipment of the International Railway, Buffalo, N. Y., as referred to in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 14, is a new figure in Buffalo traction circles. Following his education in the public and technical schools of Pittsburgh, Mr. Spraggon was employed for four years by the Westinghouse Electric & Manufacturing Company in wiring, inspecting and testing railway and industrial control apparatus, railway and industrial motors and electric locomotives and in building power apparatus, but more especially railway motors, control apparatus and electric locomotives.

In January, 1914, he became assistant master mechanic of the eastern division of the Terre Haute, Indianapolis & Eastern Traction Company and served in that capacity for more than two years. Then it was that he was appointed inspector of rolling stock with the Connecticut Company, New Haven, Conn., acting in the capacity of assistant supervisor of equipment for a period of four years. From March, 1920, to August, 1921, he served as salesman for the Westinghouse Electric & Manufacturing Company in the Boston office, handling central station and industrials. From August, 1921, until December, 1924, he was supervisor of equipment with the Connecticut Company. His return to the Connecticut Company followed the death of H. W. Beebe, who had been supervisor of equipment. In December of last year he became superintendent of equipment with the International Railway. In this capacity he succeeds George Hulme, who was made superintendent of shops.

At the time of Mr. Spraggon's appointment, mention was also made in the ELECTRIC RAILWAY JOURNAL of the election of B. J. Yungbluth as vice-president in charge of operation and of the appointment of G. W. Barker as operating manager of the International Bus Corporation, a subsidiary of the International Railway.

Organization Changes in Pittsburgh

Jurisdiction of Messrs. Phillips, Rossell and Williams Rearranged in the Interest of Improved Effectiveness of Personnel

ACCORDING to a circular dated March 1, 1925, T. Fitzgerald, vice-president of the Pittsburgh Railways, Pittsburgh, Pa., announced the appointment of F. R. Phillips to the position of general manager in charge of operations. Mr. Phillips' former title of mechanical and electrical engineer is abolished.

Effective the same date, Mr. Phillips announced the appointment of W. T. Rossell to the newly created position of superintendent of maintenance. In this position Mr. Rossell, reporting to the general manager, will be in charge of all maintenance, track, equipment, shops, carhouses, overhead lines and substations. Oscar Williams was appointed to fill the vacancy caused by Mr. Rossell's advancement.

In essence, this amounts to the creation of two general managers, one charged with the operation of the property, the other charged with the maintenance of the plant and equipment.

The commercial manager and the research manager continue to report to the vice-president.

Mr. Phillips is prominently known in the electric railway industry. For many years he was master mechanic of the Cleveland Railway, a position which he held until he went to Pittsburgh in 1909 to assist in the development of railway service in that city. He is particularly well known for his inventive work, being the originator of a number of railway devices. He has also appeared as an expert in proceedings before public bodies in which expressions of opinion on moot points were sought from an authoritative source.

Mr. Rossell became superintendent of way of the company at Pittsburgh last July. He has been connected with many large railway companies and prior to going to Pittsburgh was connected with the city railway in Cincinnati.

Mr. Williams has been a resident of Pittsburgh most of his life. He entered the employ of the Pittsburgh Railways in 1902 and has been connected with that company ever since.

Each of the new officers has been the subject of a biographical sketch published within the last few years in the ELECTRIC RAILWAY JOURNAL in connection with appointments made previously at Pittsburgh.

F. R. Phillips

W. T. Rossell

Oscar Williams

P. C. Dings, a director of the Illinois Power & Light Corporation, Chicago, Ill., has been elected treasurer of the company to succeed George M. Mattis.

C. R. Winkler, power salesman for the Arkansas Central Power Company, Little Rock, Ark., and secretary of the local electric club, has gone to Jackson, Tenn., where he will be in charge of the commercial department of the Jackson Railway & Light Company.

W. Nelson Smith, consulting electrical engineer of the Winnipeg Electric Company, has returned to Winnipeg, Man., after a leave of absence of about a year in Vancouver, B. C., where he assisted the Sydney E. Junkins Company, Ltd., in preparing a report on the electrification of the mountain district of the Canadian Pacific Railway. Mr. Smith's experience in steam railway electrification reaches back more than 20 years. After designing a number of long interurban railway systems, he took a leading part in laying out the electrifications of the Erie Railroad at Rochester, N. Y., and the Long Island Railroad. Mr. Smith is now engaged in a valuation of the extensive light and power distribution system of the Winnipeg Electric Company.

Obituary

George F. McKay, secretary of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., died on March 21 while en route from his office to his home. Since last year Mr. McKay has assumed the rôle of secretary as successor to Thomas Mason. Early in his career Mr. McKay entered the service of the Lake Shore & Michigan Southern Railroad in the traffic department. Later he became manager of the Erie *Dispatch,* which position he held for a number of years. He then accepted a position as traffic manager of the Lackawanna Steel Company, Buffalo, N. Y. He resigned this position several years ago to look after his personal interests in the chemical business. On Jan. 16, 1924, he became connected with the Washington, Baltimore & Annapolis Electric Railroad in the capacity of secretary, holding this position up to the time of his death. He was 64 years old.

Charles C. McBride, treasurer of the West Penn Company, the West Penn Railways, the West Penn Power Company and subsidiary companies, Pittsburgh, Pa., died March 13.

Logan Grant McPherson, economist and railroad authority, died on March 23 at St. Luke's Hospital, New York City. He served as chief statistician for the Rock Island System in 1900. The following year he became assistant to the late Samuel Spencer, who represented the associated railways of the United States. On the invitation of a committee of American railway presidents he organized the Bureau of Railway Economics in Washington in 1911 and was its director until 1914. Mr. McPherson was 62 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Procedure of Federal Trade Commission Revised

Considerable reduction in the activity of the Federal Trade Commission is forecast by the recent change in its rules of procedure. Henceforth the commission will proceed only with those cases where the interests of the public are substantially involved. It will refuse to interfere in controversies between competitors where redress can be effected through the courts. Moreover, the respondents will always be granted an informal hearing before the complaint is issued and the case will be dismissed if there is a voluntary cessation of the unfair practice. Two cases have already been dismissed under the new rules and well-informed opinion in Washington is that the number of complaints issued will probably be reduced about 80 per cent.

A further decrease in the commission's activity may be expected as the result of a rider attached to a recent appropriation bill. This would require the assent of both houses of Congress to resolutions directing special investigations unless the inquiry is made necessary by a violation of the anti-trust laws.

First Grand Rapids Test Car Delivered

The first of three cars which are to be subjected this spring to competitive tests has been received by the Grand Rapids Railway, Grand Rapids, Mich. This car, or as the local railway officials prefer to call it, "electric motor coach," was made by the Light-Weight Noiseless Electric Car Company. The other two are being made by the St. Louis Car Company and the Kuhlman Car Company. These are expected to be delivered within the next two weeks.

L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, and other officials made a preliminary test of the car and then ordered it to the shops for certain minor changes and additions to equipment. It is planned to install meters on all three cars to check every phase of their operation during the test. The first tryout indicated a substantial reduction in power consumption.

A reduction of 33,500 lb. has been made in the weight of the first car from that of the cars now being operated in Grand Rapids. It is constructed with heat-treated steel, specially prepared Haskelite veneered wood panels and aluminum to reduce the weight without impairing the strength and durability of the body. The axles are bored with a 2¼-in. hole throughout their length. Metal has been removed from the wheels by boring eight 3-in. holes in the web. This process is expected also to reduce noise due to vibration of the wheel. Roller bearings for journals and armatures are designed to provide quicker acceleration and to facilitate coasting. Automobile-type drum brakes are used on all four axles.

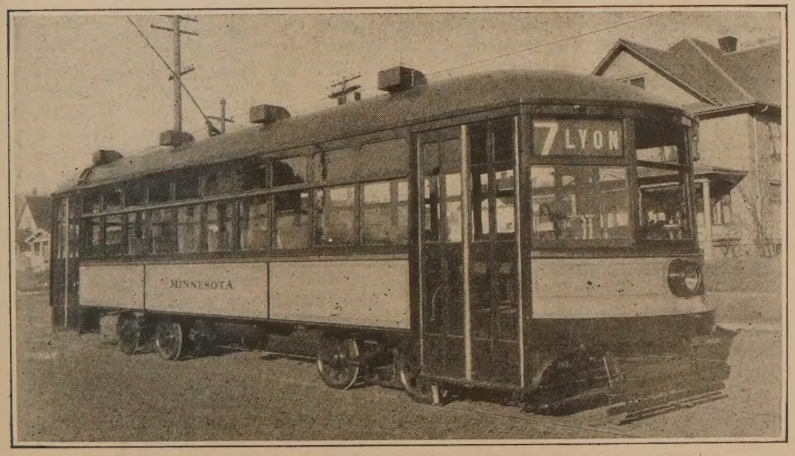
A new type of electric lighting arrangement designed by a member of the railway staff has been installed. This is intended to give the greatest intensity of light at the level of the eye of a seated passenger. The inside trim of the car is mahogany. The seats are wide with plenty of knee room and are of rattan stained green. The windows of the car are exceptionally wide and open upward. Low arm rests are provided.

The new cars are designed and equipped to be operated as single units with one trainman, or with a motorman and conductor as the density of traffic may require.

Door opening and closing at both ends can be controlled from the front platform. A comfortable seat specially designed is provided for the operator.

A feature of this first car is its outside coloring. It is painted in the colors of the University of Minnesota and carries the name "Minnesota" on the sides. The other two cars will be painted in the colors of the Ohio State and St. Louis Universities. Construction details are given in the accompanying table.

Date order was placed	Sept. 24, 1924
Date of delivery	March 24, 1925
Builder of car body	Lightweight Noiseless Electric Car Co.
Type of car	Closed passenger
Seating capacity	43
Total weight	24,500 lb.
Length over all	37 ft. 6 in.
Truck wheelbase	4 ft. 6 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	10 ft. 5 in.
Body	Haskelite
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air Brakes	Safety Car Devices Co. concentric clasp axle drum type
Armature bearings	Hyatt roller
Axles	Tubular
Bumpers	Lightweight-Noiseless Electric Car Co.
Car signal system	Faraday
Car trimmings	Lightweight-Noiseless Electric Car Co.
Center and side bearings	Lightweight-Noiseless Electric Car Co.
Conduits and junction boxes	Crouse-Hinds
Control	G.E. K-35-KK
Couplers	Lightweight-Noiseless Electric Car Co.
Curtain fixtures	National Lock Washer No. 86
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic Co.
Fare boxes	Woods
Fenders	H. B. lifeguards
Gears and pinions	G.E. Grade M.
Hand brakes	Peacock staffless
Heater equipment	Railway Utility
Headlights	Crouse-Hinds
Journal bearings	Hyatt roller
Journal boxes	Lightweight-Noiseless Electric Car Co.
Lightning arresters	G.E. aluminum cell
Motors	Four G.E. No. 258, inside hung
Paint and varnish	Sherwin-Williams
Sanders	Keystone
Sash fixtures	National Lock Washer
Seats	Lightweight-Noiseless Electric Car Co.
Seating material	Rattan
Springs	Elliptic
Step treads	Kass
Trolley catchers	Ideal, No. 10
Trolley base	Ohio Brass, Form 1
Trolley	Wheels
Trucks	Smith No. 12
Ventilators	Railway Utility
Wheels	26-in. steel
Power-saving device	Economy meter



First of the Three Test Cars Being Built for the Grand Rapids Railway

Colorado Railway to Be Improved

The Southern Colorado Power Company, Pueblo, Col., will spend about $1,000,000 this spring for betterments. The work will include improvements to the car tracks in Pueblo, the erection of substations and the placing of larger capacity generators.

Metal, Coal and Material Prices

Metals—New York	Mar. 24, 1925
Copper, electrolytic, cents per lb	14.00
Copper wire base, cents per lb	16.50
Lead, cents per lb	8.93
Zinc, cents per lb	7.65
Tin, Straits, cents per lb	53.875
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.375
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.90
Kansas screenings, Kansas City, net tons	2.75
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.75
Weatherproof wire base, N.Y., cents per lb.	19.00
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.12
White lead in oil (100-lb. keg), N. Y., cents per lb., carloadlots	0.1272
Turpentine (bbl. lots), N. Y., per gal.	0.935

Power Show to Feature Heating and Ventilating Equipment

Heating and ventilating equipment will form one of the large sections of the Fourth National Exposition of Power and Mechanical Engineering to be held in the Grand Central Palace, New York City, from Nov. 30 through Dec. 5, 1925. At the present time 95 manufacturing concerns have signed contracts for space in which to exhibit all types of forced-draft apparatus, heating devices, ventilating equipment and temperature regulators, as well as instruments and fittings used in the heating and ventilating field.

Rolling Stock

Ohio Public Service Company, Mansfield, Ohio, recently placed in service two light-weight, single-end interurban cars built by the G. C. Kuhlman Car Company.

Georgia Railway & Power Company, Atlanta, Ga., has announced specifications on the twenty new cars mentioned in ELECTRIC RAILWAY JOURNAL, issue of Feb. 21, 1925. The details follow:

Date of delivery	Jan. to Feb., 1925
Builder of car body	Cincinnati Car Co.
Type of car	Double-truck, double end, city
Seating capacity	48
Total weight	35,000 lb.
Bolster centers, length	20 ft. 6 in.
Length over all	46 ft. ½ in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3 in.
Height, rail to trolley base	11 ft. 8 in.
Body	All steel
Interior trim	Natural cherry
Headlining	Agasote ¼ in.
Roof	Monitor
Air brakes	Westinghouse
Axles	Quenched and tempered
Bumpers	Anti-climber, Cincinnati Car Company
Car signal system	Consolidated
Car trimmings	Statuary bronze
Center and side bearings	Oil-retaining slide
Control	K 35JJ
Destination signs	Keystone ILR
Door-operating mechanism	Sliding door
Lifeguards	H B, Atlanta type
Gears and pinions	GE long and short addendum
Hand brakes	Peacock staffless
Heater equipment	Consolidated, panel type
Headlights	Crouse-Hinds 28569
Journal boxes	MCB Symington
Lightning arresters	Aluminum cell
Motors, type and number	Four GE No. 265-A, inside hung
Registers	Ohmer
Sanders	Ohio Brass No. 1
Sash fixtures	Rack and pinion
Seats	H & K, AWO 400
Seating material	Cane
Slack adjuster	American Brake Company, Form E
Step treads	Aluminum
Trolley catchers	Ohio Brass
Trolley base	O. B. Form 1
Trolley wheels	Nuttall
Trucks	Cincinnati Car Company (AB, 64 D)
Ventilators	Monitor sash
Wheels (type and size)	26-in. cast iron

Oklahoma Railway, Oklahoma City, Okla., will improve its equipment if the recommendations made by G. H. Clifford, acting as consultant, are carried out. These improvements include the purchase of fifteen new cars at a cost of $112,500, equipping ten of the present safety cars for both single and double operation at a cost of $44,200 and equipping cars with power-saving devices to reduce operating cost, at a cost of $6,100.

Denver Tramway, Denver, Col., will purchase ten buses in line with plans it has developed, to which reference is made elsewhere in this issue.

United Railways, St. Louis, Mo., has ordered five six-wheel buses from the Six Wheel Company, 1880 Lehigh Avenue, Philadelphia, Pa. The chassis is furnished by the Philadelphia Company, but the bodies of the buses are bought at St. Charles, Mo. The buses will be given a thorough trial on the St. Charles-Wellston line.

Stark Electric Railroad, Alliance, Ohio, has purchased two de luxe buses costing about $15,000 each. These supply continuous service between Alliance and Canton.

Track and Line

Connecticut Company, New Haven, Conn., will lay tracks in Hamilton Street from Chapel to Water Street and also in East Street from Water to Chapel Street. The company has also been granted permission to extend the Winchester Avenue track from Read Street to the Hamden line.

Seattle Municipal Railway, Seattle, Wash., is now in the market for $90,000 steel rail and special trackwork layouts A. F. Pierce, superintendent of construction, has completed plans for the special layouts and specifications covering the 400 tons of 80-lb., 7-in. T-rail desired. The rails will cost $25,000 and the special work about $65,000.

Pacific Electric Railway, Los Angeles, Cal., has completed the installation of a new double track curve connection at Ninth and San Pedro Streets, at a cost of $32,000. The new curve will permit the handling of freight traffic on San Pedro Street and make possible the serving of industries to be located in the industrial district between Ninth and Aliso Streets. This will permit freight service to the new Westinghouse Electric & Manufacturing Company plant recently established on San Pedro Street.

Shreveport Railways, Shreveport, La., will extend its line into the new Broadmoor subdivision if the engineers making the preliminary survey believe the extension is practical.

Puget Sound Power & Light Company, Seattle, Wash., will begin work immediately on replacing 60-lb. rails on West Holly Street with 93-lb. rails and the paving of its right-of-way on this street in Bellingham between the alley below Bay Street and B Street.

Power Houses, Shops and Buildings

Milwaukee Northern Railway-Wisconsin Power & Light Company recently opened up their new joint terminal at Sheboygan. The new terminal, modern in every detail, was designed to take care of the future growth of traffic. The main portion of the interior comprises a large waiting room. A pleasing feature is the loading and unloading of trains under the canopy.

Wheeling Traction Company, Wheeling, W. Va., is erecting a new terminal in Steubenville.

Trade Notes

Edgar C. Walthall has joined the sales organization of the Boiler Equipment Service Company, Candler Building, Atlanta, Ga., district engineers of the Conveyors Corporation of America, 326 West Madison Street, Chicago, Ill. Mr. Walthall was graduated from the Georgia Institute of Technology and was recently superintendent of the fire brick plant of Stevens, Inc., at Stevens Pottery, Ga. He is experienced in marine and heating engineering.

Wollmar Engineering Corporation, New York, N. Y., has appointed A. J. Gillespie sales representative for its Cleveland office for N. K. A. ball and disk bearings. He was for more than six years in the ball bearing industry in Ohio, having been district manager for Hess-Bright and S. K. F. and for the last three years in anti-friction engineering in his own business and president of the A. J. Gillespie Company. His headquarters will be at 8500 Lake Avenue, Cleveland, Ohio.

Universal Crane Company, Cleveland, Ohio, has appointed the Factory Products Company, 204 Oliver Building, Pittsburgh, Pa. its representative covering the Pittsburgh territory. W. W. Adams, president of the Factory Products Company, has been identified with the sale of locomotive cranes since 1907.

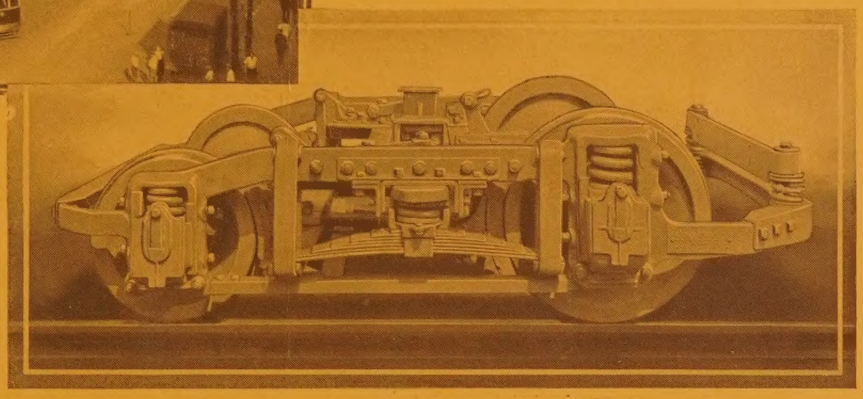
William Pestell has been made a vice-president of the Riley Stoker Corporation, Worcester, Mass., and will continue to have supervision of all sales for the Riley Stoker Corporation. Mr. Pestell is widely known in the power plant field because of his many years experience in charge of mechanical and electrical equipment with the Lynn & Boston Railroad, the Worcester Consolidated Street Railway, the United Electric Railways of Providence and the Allis-Chalmers Company, Boston. Mr. Pestell also spent several years as a mechanical engineer for the J. G. White Engineering Corporation. He is a fellow of the American Institute of Electrical Engineers and a member of the American Society of Mechanical Engineers. He has been connected with the sale of Riley stokers from the start of the company, first as Western sales manager, with headquarters at Chicago, and since 1921 as sales manager, with headquarters at New York and Worcester, Mass.

William Bonn, formerly plant superintendent of the auto body plant of the Pullman Company, and later assistant general sales manager, has been appointed assistant general manager, with headquarters at Chicago, of the W. M. Lalor Company, railway sales representatives of the Zapon Company, manufacturer of leather cloth, lacquers and enamels.

Mack Trucks, Inc., New York, N. Y., has purchased a square block in Jersey City on which the company will erect a large plant. Officials explain that the Jersey City site was decided upon because of the benefits for deliveries in Greater New York through the New York-New Jersey vehicular tunnel. The cost of the plant is not known.

BRILL

Single-Motor 39-E Truck



Everywhere in Philadelphia

Two-hundred More Brill 39-E Trucks for Philadelphia Rapid Transit Co.

The one hundred single-end front-entrance center-exit cars, now under construction for P. R. T., will also be mounted on Brill Single-motor 39-E Trucks. This type truck has been Philadelphia's standard for years, and has kept pace with the progressive development of this important transportation system.

Like all important members of the Brill truck family, the side-frames are solid forged. Also its riding action leaves nothing to be desired. The Brill Graduated Spring System insures equally good action under both light and heavy loads, and the Brill Bolster Guide, which keeps the bolster in its proper relation to the transoms under motor and brake pressure, thus eliminating noise and vibrations, also contributes toward smooth and comfortable riding action.

Described and illustrated in Brill Truck Bulletin No. 272.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

Electrified rapid transit for Staten Island

RELIABLE, fast and frequent service is necessary to handle Staten Island's dense suburban traffic. By electrification the Staten Island subsidiaries of the Baltimore & Ohio Railroad will provide such service in the most generous measure.

Thirty four track-miles are being electrified; eighty 72-passenger motor cars are on order for operation in multiple-unit trains at speeds up to 50 miles per hour.

General Electric Motors and Control will be used exclusively.

11-7

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK